THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. LIX. SATURDAY, SEPTEMBER 5, 1891. NO. 10.

ORIGINAL ARTICLES.

REPORT OF FIVE SURGICAL CASES FOLLOWING GUNSHOT INJURY.

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CASE I.—On May 7, 1886, I was ordered to Nogales, Arizona, to see Corporal E. S., who on May 3d, in the Sierra Pinita, Sonora, Mexico, had been shot in a skirmish with hostile Apaches. This man rode horseback eight miles on the same day, and on the day following he was carried in a wagon without springs a distance of twenty-eight miles. On the day of his removal, cold-water applications and a side splint were put on his thigh by Dr. Purdy, a civilian physician from Nogales. Except a few injections of morphine, he received no other treatment until my arrival in Nogales on the evening of May 7th. I found him in a room without any window, a door opening into the corridor being the only means of ventilation. I made a cursory examination of his wounds, but as he was suffering greatly, deferred my systematic examination until the following morning. The knee and foot were greatly swollen and inflamed. As he had a temperature of 104.8°, and was suffering for want of fresh air, I had his bed moved into an open shed, much to his comfort. Ice-water applications were placed upon his knee and foot, and I gave orders to have them constantly renewed during the night. On the morning of May 8th I made a careful examination of his wounds, and found that he had been hit by a bullet, caliber 45, that had entered the right knee-joint a little above the middle of the internal edge of the patella. The projectile passed through the internal condyle of the femur, then downward through the head of the tibia, and emerged from the leg about the center of the middle third on the internal lateral aspect. After emergence from the leg it still continued its course downward and forward, and penetrated the left foot on its superior aspect, finally lodging between the second and third metatarsal bones, fracturing, but not comminuting them. The internal condyle of the femur and the head of the tibia were both badly shattered. I considered amputation to be necessary, although I had grave doubts as to the result, both on account of the intense inflammatory action, and also from the length of time that had elapsed since the injury was received, and the fact that the amputation must necessarily be "intermediate." Accordingly, at 11 A.M., assisted by Drs. Terrill and Purdy, I proceeded to amputate the thigh in the lower third by a modified antero-posterior flap operation. A. C. E. mixture was used as the anesthetic, and Esmarch's tourniquet was employed to restrain hemorrhage. Four silk ligatures were applied, but even then there was free parenchymatous oozing from the flaps, which was instantaneously arrested by hot water at a temperature of 150° F.

Since 1878 I have habitually used hot water, never under 150° F., to check parenchymatous hemorrhage following the use of Esmarch's tourniquet, and I have invariably tested the temperature, before using, with a small chemical thermometer. In the Philadelphia *Medical Times* of August 30, 1879, page 569, is a brief article communicated by me in reference to this use of hot water. Dr. Charles T. Hunter, at that time Demonstrator of Anatomy in the University of Pennsylvania, in an article published in the same journal, "On the Use of Hot Water as a Hemostatic in Surgery," (November 22, 1879, page 91), says that this high temperature of the water "is a matter of some surprise, for it is reasonable to suppose that a degree of heat sufficient to coagulate albumin would scald living tissues and excite a grade of inflammatory action incompatible with union by first intention." Facts are stronger than suppositions. I have used hot water, never less than 150°, very nearly a hundred times since December, 1878, to restrain hemorrhage, and not once have I seen it give rise to even the slightest inflammatory action.

A rubber drainage-tube was then inserted at the angle of the wound, the flaps irrigated with sublimate solution 1:1000, and united by deep and superficial silk sutures. The amputation-wound was dusted with iodoform, covered with sublimate gauze, and the stump wrapped in absorbent cotton and snugly bandaged. The foot was then examined, and although the ball could be located with the Nélaton probe, it was so tightly wedged between the bones that I did not deem it advisable at that time to remove it, as the patient had been sufficiently long under the anesthetic. The foot was then irrigated and dressed. No attempt was made to make the operation an antiseptic one, although the parts, hands, instruments, etc., were made thoroughly clean before the operation. On May 10th S. was placed on the cars and transported forty-nine miles, and then seven miles in an ambulance to Fort Huachuca. Twenty-four hours after the operation I turned the case over to Dr. Terrill, who accompanied him to this post, I being ordered into the field. The dressings were removed on the evening of May 13th on account of some bloody oozing, much sooner than there was any necessity. Union

of the flaps was found to be complete, except where the drainage-tube was inserted. On May 16th the stump was completely healed. On May 22d the bullet in the foot was removed, the wound soon healing. An examination of the knee-joint after the operation showed, in my opinion, that under the circumstances amputation of the thigh was the only justifiable operation, as the internal condyle of the femur and head of the tibia were shattered into a dozen fragments, and all statistics of military surgery to date give a most frightful mortality following excisions of the knee-joint for gunshot fracture, greatly exceeding that of amputations of the thigh in the lower third.

The pathological specimen has been sent to the Army Medical Museum at Washington, D. C., and also a photograph representing the appearance of the stump January 1, 1887.

CASE II.—E. K., twenty-five years old, an American, a miner by occupation, and of good habits and fine physique, on February 19, 1886, while passing through Santa Rosa Cañon, Mexico, was fired upon by hostile Chiricahua Apaches and seriously wounded in two places. One bullet, caliber 45, entered the left knee-joint at the middle of the external lateral border of the patella, just grazing it, and then, passing downward and inward, penetrated the head of the tibia, comminuting it and completely separating from its articulation fully one-half of the head of the internal portion of that bone, and finally lodged underneath the skin four inches below the articulation on the internal lateral aspect of the leg. The second bullet, caliber 44, after passing through the sides of a heavy lumber-wagon, entered the right foot on its external lateral aspect, shattered the cuboid bone, and, passing forward, lodged between the fourth and fifth metatarsals, comminuting them. In spite of these serious wounds, K. succeeded in cutting a mule loose from the wagon, mounted it and rode eight miles to his camp, and then fell from the animal, fainting from shock and loss of blood. His fellow-miners did all they could for him, putting cold-water compresses upon his wounds and giving him laudanum to alleviate his suffering, he requiring nearly a quarter of an ounce at a dose. An irregular practitioner from Moctezuma, Sonora, was summoned, whose principal object seemed to be the removal of the bullets, everything else being of secondary importance. After removal of the ball from the leg he poured pure carbolic acid into the wounds and about them, nearly skinning the man's leg, and finally put on side splints and left him. Within a week the wounds were suppurating freely, small fragments of bone occasionally being discharged. Two months after the injury a small abscess formed on the internal lateral aspect of the thigh, communicating with the initial wound of the knee. Save that above mentioned, he received no surgical treatment until I took charge of the case. As he was rapidly losing flesh and strength from the profuse suppuration, he was sent up from Sonora, riding 110 miles over rough roads, and brought to me for examination on July 23, 1886, five months after the injury. He was very much emaciated, exceedingly weak and nervous, and had a temperature of 101.8°. Three fistulous openings on the inner side of the upper third of the leg were discharging freely, and large, loose fragments of dead bone could be plainly felt with the probe. There were also two fistulous openings in the right foot that were discharging pus, and, upon probing, dead bone could be detected. I urged the necessity of an immediate excision of the knee-joint or an amputation of the thigh, but the patient bitterly opposed both procedures, and left the hospital the same day.

On August 4th he returned and placed himself under my care, still strenuously opposing any capital operation. The knee-joint was ankylosed and the relations of the parts were so much changed from their normal condition that it was virtually impossible to ascertain the magnitude of the lesion. As there was much uncertainty as to the extent of the injury to the knee-joint, I informed the patient that there was a bare possibility of saving his leg by cutting down upon it and removing all dead and carious bone. This I did, on August 6, 1886, taking away three large, loose fragments and chiselling out all that what was necrosed or carious. During the operation it was discovered that the large fragment of the head of tibia detached at the time of the injury, although living, had been entirely separated from its articulation and forced externally and posteriorly, so that it lay behind the fibula and in contact with the external condyle of the femur, being ankylosed to both bones. The operation-wound was irrigated with sublimate solution 1:1000, stuffed with absorbent cotton soaked in the same solution, dusted with iodoform and covered with sublimate gauze. The case progressed favorably for six weeks, the patient's general condition greatly improving. The suppurative discharge was very slight and it began to look as if the leg might yet be saved. But a suspicious redness appeared over the external lateral aspect of the articulation that in a few days culminated in a well-defined abscess, the patient having an evening temperature of 103°. This was freely opened and irrigated with sublimate and the joint carefully examined with a probe, with the result of finding the condyles of the femur in a carious condition. At my earnest solicitation the patient finally consented to permit me to use my own judgment in regard to the case. I decided to cut down upon the knee-joint and perform excision in case the lesion of the femur was not extensive; if it was, to amputate the thigh at whatever point I might find sound bone. The operation was performed on September 7, 1886. Both condyles of the femur were found to be seriously diseased and there were also carious patches fully three inches above upon the lower part of the shaft. Amputation of the thigh about the middle of the lower third was then performed by a modified circular operation. A. C. E. mixture was the anesthetic. Esmarch's tourniquet was used to restrain hemorrhage, and catgut employed for ligatures and sutures. Rubber drainage-tubes were placed in the angles of the wound, the stump irrigated with sublimate

1 : 1000, and the edges of the amputation-wound united by deep and superficial sutures. Iodoform was then dusted on the wound and the stump was wrapped in sublimate gauze and absorbent cotton and very snugly bandaged. Whilst dressings were being applied to the amputation-wound, I cut down upon the lateral external aspect of the right foot and removed the cuboid bone and parts of the forth and of the fifth metatarsals. The wound of the foot was dressed similarly to that of the thigh, and one-half grain of morphine given hypodermatically. The patient's temperature on the morning after the operation was 99.6°, three and two-tenths degrees lower than on the day before, and at no time after the operation did his temperature go above 100.2°. Both stump and foot were dressed on the seventh day. There was no purulent discharge from the stump, the amputation-wound having almost entirely healed by first intention and fully one-half of the wound in the foot had healed in the same manner. The case progressed favorably every way, strict asepsis being observed, and in twelve days after the amputation the stump was entirely healed. The foot healed much more slowly, but on November 1st the patient left the hospital, well and in magnificent condition, with the aid of crutches walking upon the injured foot.

The pathological specimen, which, so far as I know, is unique, has been forwarded to the Army Medical Museum at Washington. It shows what tremendous efforts unassisted Nature sometimes puts forth to repair an injury. That the internal half of the head of the tibia, torn from its articulation with the internal condyle of the femur, should retain its vitality and eventually become completely transposed and ankylosed to the external condyle of the fibula and the posterior surface of the other half of the head of the same bone, seems almost incredible, but such is the fact. I am greatly indebted to Chas. C. Barrows, Assistant Surgeon U. S. A., for valuable assistance rendered me during the last two operations on E. K.

CASE III.—On December 15, 1886, while hunting, Private Martin P. Johnson, Fourth Cavalry, was accidentially shot by a comrade. At the time he was shot, he bled profusely, but his comrades succeeded in stopping the hemorrhage by tightly bandaging his leg. On the same day he was carried to a ranch six miles distant. A messenger was sent to the post and Assistant Surgeon T. S. Mason immediately started back with the messenger, reaching the ranch at 3 A.M. As the hemorrhage was controlled, Dr. Mason, fearing a renewal of the hemorrhage, only made a cursory examination of the wound In five hours he started back with Private Johnson and arrived at the post at 8 o'clock in the evening. Owing to the lateness of the hour, I ordered cold antiseptic lotions to be applied to the ankle during the night. The next morning, after etherizing the patient, I carefully examined the leg and found that the ankle-joint was irreparably injured, the carbine bullet, caliber 45, having entered the left foot just above the os calcis, on its internal lateral aspect, had passed obliquely upward, forward and outward through the tibia and fibula about half an inch above the articulation with the astragalus, comminuting them fully three inches above the joint. The articular surface of the tibia was broken into fragments, and in all probability the main arteries of the leg had been torn across. This was, after operation, found to be the fact. The ankle was badly swollen and inflamed and the wound very offensive in spite of the antiseptic applications. I immediately proceeded to amputate the leg at the upper border of the lower third by the ordinary circular operation. Two ligatures, both of gut, were applied to the anterior tibial and peroneal arteries, the posterior tibial being absent. The edges of the amputation-wound were brought together with gut sutures, after irrigation with sublimate 1 : 1000, then dusted with iodoform and covered with sublimate gauze and the stump wrapped in cotton and firmly bandaged. One-half grain of morphine was then given subcutaneously. The stump was not dressed until the fifth day. There was no purulent discharge, but there had been some oozing of bloody serum. The wound was about two-thirds healed by first intention. The stump was irrigated internally through a drainage-tube, the insertion of which I omitted to mention, with sublimate 1 : 2000, and again dressed as before. The case progressed favorably until the thirteenth day, when there was a slight hemorrhage from a small opening that was still unhealed and the whole stump was inflamed. The inflammation was subdued in twenty-four hours and the case went on uninterruptedly to recovery in a little more than three weeks.

An examination of the amputated leg fully justified the operation, as the tibia and fibula had been broken into fragments, eleven in number, some entirely detached, others nearly in place. The anterior tibial and peroneal arteries had been torn across and decomposition had already commenced in the foot. Any attempt to save the leg would have been worse than useless. In the year 1877 I had a case almost identical, save that the arteries were not injured. An attempt was made to save the leg, but after seven or eight months of fruitless labor on my part and a great deal of suffering on the part of the patient, I was compelled to amputate in the lower third. A special report of the case, and also the morbid specimen, were at the time forwarded to the Surgeon-General's Office.

CASE IV.—Private W. R., Company C, 17th U. S. Infantry, aged forty-seven, of Irish birth, was admitted into the post hospital, Fort D. A. Russell, Wyoming, on July 21, 1887, "suffering from a severe penetrating gunshot wound of the right shoulder, with injury to the head of the humerus, the ball passing through the shoulder-joint downward and backward, probably lodging under the scapula. The missile was a 45-caliber rifle bullet." Nothing in the way of operation had been attempted prior to my taking charge of the case in November

1888. At that time the arm and shoulder were honeycombed with sinuses which were discharging profusely, and rapidly draining the vitality of the patient. For over fifteen months he had been in bed, and this also had greatly weakened his constitution. On account of the swollen and indurated condition of the shoulder it was virtually impossible to make a precise diagnosis, but after careful probing I decided that there was necrosis of the coracoid process and glenoid cavity, and of the head and shaft of the humerus to at least two inches below the surgical neck. From time to time small fragments of bone had been discharged from the various sinuses. I then determined that after getting the patient in as good general condition as possible, I would cut down upon the shoulder-joint, remove the necrosed bone from the scapula, and exsect the head and as much of the shaft of the humerus as might be found diseased. By opening some of the sinuses and the daily irrigation of all of them with antiseptic solutions, the amount of purulent discharge was greatly reduced. The improved condition of the patient soon demonstrated the advisability of this procedure. On November 19, 1888, a year and very nearly four months after the injury, I proceeded to carry out the various steps of the operation above mentioned. Ether was used as the anesthetic, and Esmarch's tourniquet as the means of controlling hemorrhage. The first incision was about five inches in length, commencing at the superior edge of the glenoid cavity of the scapula and extending down the middle of the external aspect of the arm. Another incision of three inches in length was now carried across the upper edge of the glenoid cavity and at a right angle with the first one, the two incisions forming a T. These incisions fully opened up the joint. As ankylosis had taken place, to break up the adhesions with very little force I lifted up the arm, when to my surprise the humerus broke off at about the middle of shaft, showing a very much more extensive necrosis than I had anticipated, and adding greatly to the difficulty of the operation and to the risk to the patient. I then cleared the upper fragment of the shaft, disarticulated the head of the humerus and curetted the edges and bottom of the glenoid cavity, removing nearly the half of the coracoid process of the scapula. Then, after lengthening the primary incision, I exsected the lower fragment of the shaft of the humerus at a point four inches above the elbow-joint. During the operation, hemostatic forceps were applied to the spirting arteries, for which, later on, catgut ligatures were substituted. To restrain capillary hemorrhage the wounds of operation were douched with hot water, and, after the introduction of drainage-tubes, closed with deep and superficial sutures of silk. Iodoform was then dusted over the wounds, which were then covered with gutta-percha tissue, with an outside dressing of sublimate gauze. During the last half-hour of the operation the patient was almost *in articulo mortis*, several times becoming pulseless, and twice his respiration stopped. Ether and brandy were injected hypodermatically, the muscles of the chest stimulated by electricity, artificial respiration practised, and as a last resort diluted aqua ammoniæ injected into the median basilic vein. This was followed by a most favorable result, the respiration, although shallow, soon becoming regular, and the pulse reappearing at the wrist. Still for twelve hours the patient was in a very critical condition. The progress toward recovery was very slow, and months elapsed before the wounds of operation were firmly healed. Several of the sinuses remained patent, indicating that some diseased bone had been left behind, and that necrosed bone was still there. This man was kept in the service until March 16, 1890, when he was discharged. Assistant Surgeon Appel, who relieved me at Fort Russell, informs me "that his arm was practically useless from swelling supervening upon any active motion. Discharge from the sinuses would be arrested for a time, but would be renewed after each supervention of inflammation."

Had I not feared that the patient would die upon the table, after my discovery of the extensive necrosis of the shaft of the humerus, I should have amputated at the shoulder-joint, and possibly under the existing circumstances this might have been the preferable operation. At the time of R.'s discharge his general condition was good, yet his arm was useless and constantly liable to inflammation, and he would have been better off without the arm. Of one thing there can be no doubt—that if, at the time of injury, the head and less than two inches of the shaft of the humerus had been excised, this man would have been well in a short time with a fairly useful arm; as it was, sixteen months elapsed before any operation was performed, and as a result his humerus and also the glenoid cavity and coracoid process of the scapula, were necrosed. An examination of the morbid specimen showed that the bullet penetrated the humerus at about its middle and just below the line of junction of the head with the anatomical neck, splitting off a large fragment, but leaving the glenoid fossa uninjured. This man's recuperative powers must have been great, as he stood the drain of a profuse suppuration for sixteen months, and in addition a formidable capital operation. I am indebted to Captain and Assistant Surgeon Frank Ives, U. S. A., and to Dr. Masten, of Cheyenne, Wyoming, for valuable assistance during the operation.

CASE V.—Sergeant H. H., Troop I., Seventh U. S. Cavalry, was admitted to Division Hospital, Pine Ridge Agency, Dakota, December 29, 1890, having been shot in an action with hostile Sioux at Wounded Knee Creek. Sergeant H. was transferred to the post hospital, Fort Riley, Kansas, January 6, 1891. The diagnosis of his case, as given on the "transfer slip," was severe penetrating gunshot-wound of the left arm. Ball entered just external to coracoid process, left scapula, passing through deltoid muscle. "Direction of ball not determined, but supposed to be in neighborhood of joint." If a more precise diagnosis had been made on the entrance of the patient into the Division

Hospital it is probable that the true nature of the injury would have been recognized and a primary operation performed for the removal of the head of humerus. This case came under my charge on January 22, 1891, I having been temporarily ordered to duty at Fort Riley. On January 21st an incision had been made in the shoulder by Assistant Surgeon J. T. Clarke, U. S. A., over the superior portion of the upper third of the humerus, for the purpose of improving the drainage. On account of the swollen and inflamed condition of the parts, I found it impossible at my first examination, to make a positive diagnosis, but felt fully satisfied that the head of the humerus had been struck by the missile and that caries and necrosis of this bone was rapidly going on. The general condition of the patient was bad. He had a daily elevation of temperature several degrees above the normal and he was rapidly becoming exhausted from the profuse suppuration. In addition, he had a severe bronchial catarrh, probably due to exposure en route from Pine Ridge. Although the outlook was not promising, Assistant Surgeon Clarke and myself concluded that it would be advisable to cut down upon the shoulder-joint, determine the extent of injury, and if it should be found necessary, to exsect the head of the humerus. On January 23d, after ether-anesthesia had been induced, two ounces of brandy having been previously administered, I proceeded to carry out the plan mentioned. I first enlarged and deepened the incision previously mentioned, carrying it down to the bone. This incision extended from the center of the superior edge of the glenoid fossa to a point on the shaft of the humerus four inches below. To facilitate the operation, I made a second incision directly over the superior edge of the glenoid cavity and at a right angle to the upper end of the first incision. The first incision opened a pocket containing a large amount of purulent débris. The tissues generally were in bad condition and infiltrated with pus, the small arteries breaking down under the forceps. Following the first incision there was very free hemorrhage, which, on account of the friability of the arteries, was exceedingly difficult to control, it being almost impossible to take them up with the hemostatic forceps. The second incision opened up the joint and it was then ascertained that the bullet had furrowed its way through the superior surface of the head of the humerus and that there was free communication with the medullary cavity of the shaft, the result of osteo-myelitis. It was then deemed best to exsect the head and a small portion of the shaft of the humerus. This was done by passing a chain-saw under the bone, cutting through it, and afterward disarticulating the head of the humerus. It was then discovered that the osteo-myelitis had attacked the humerus below the point of section and that the medulla was converted into purulent pulp. But for the exceedingly precarious condition of the patient I should have amputated at the shoulder, as I was firmly convinced, in case he survived the present operation, that a future amputation would be inevitable. From the beginning the patient did not take the ether kindly, and when I finished the operation proper, even after repeated hypodermatic injections of brandy, he was almost moribund. The operation-wounds were douched with hot sublimate solution 1 : 2000 and rapidly closed with interrupted sutures of silk, a drainage-tube having been introduced. The wounds were then dusted with iodoform and covered with compresses of sublimate gauze. Hot-water bottles were placed around the patient and a half grain of morphine was given hypodermatically. In about twenty minutes there was some reaction and, being able to swallow, he was given some strong coffee and brandy. Stimulants by mouth and rectum were given from time to time, but the patient gradually sank and died of exhaustion at 8 P.M. on the same day, six hours and a half after the conclusion of the operation.

Death in this case probably resulted from the shock of operation and hemorrhage, which latter, although not excessive, was sufficient in the patient's enfeebled condition, added to the shock, to superinduce an unfavorable termination. The quantity of ether consumed was twelve ounces. The length of exsected bone was two inches and a half. The morbid specimen has been sent to the Army Medical Museum. I am deeply indebted to Assistant Surgeon J. T. Clarke for his skilful assistance during the various stages of the operation.

These cases have not been reported because they present any very marked peculiarities or anything original in the way of operation or treatment, but because they are cases representative of injuries which at present are rarely seen in military and hardly ever in civil practice. They are also illustrative of the havoc that the modern rifle-bullet produces when traversing a joint or passing through bony tissue. When one of these projectiles enters a joint, it comminutes everything within three or four inches. The tremendous force with which these missiles are propelled not only makes them destroy and devitalize bony tissues directly in their path, but also makes every fragment another projectile which in its turn breaks and rends. When it is considered that the rifle-bullet, weighing from four to five hundred grains, impelled by the explosive force of from seventy to ninety grains of gunpowder, will kill at a greater distance than two thousand yards—more than a mile—these injuries are not so marvellous. The experience of our Civil War, as recorded in the *Surgical History of the Rebellion*, most strongly trends in the direction of primary operations when large joints are opened and especially so in injuries of the shoulder-joint. During the last twenty years a strong tide of conservative surgery has swept over the world and now no injury is looked upon as necessitating a capital operation unless vitality in the wounded part is absolutely destroyed. This, I think, is a grave error, especially as regards gunshot wounds produced by missiles

the caliber of which exceeds 38. In addition to the apparent injury, the concealed injury must be taken into consideration, as it often becomes the most important factor in the case. Take for instance the case of Sergeant H. The head of the humerus had been furrowed by a bullet of large caliber, with no apparent fracture, and at first sight the injury does not seem sufficiently severe to demand operative interference; yet when we bear in mind the fact that the cancellous tissue for an inch beyond the track of the missile was probably devitalized by the tremendous impact of the ball and that in this class of cases caries and necrosis must almost be the inevitable result, it may be well to consider the future danger, and by timely operative interference save life and limb. A primary exsection would probably have saved Sergeant H.'s life and given Private R. a useful arm. Asepsis will do much, and I know of no heartier advocate of its merits than myself, yet I am of the opinion that whenever any of the large joints are injured by the modern rifle-bullet of large caliber, conservative surgery must fall to the rear and give place to more heroic methods. Civil surgeons rarely encounter such cases, most of the gunshot wounds that they treat being made by bullets of small caliber, from 22 to 38, and propelled by small charges of powder. Here conservative surgery has a most brilliant opportunity, the injury done by such projectiles being limited in extent, because they do not have sufficient force to do much harm outside of their direct course.

THE CAUSES AND PREVENTION OF DIPHTHERIA IN CITIES.[1]

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THE air that surrounds our earth like a vast sea, at the bottom of which we dwell, teems with innumerable forms of minute organisms, some animal and some vegetable, which, possessing vitality, are subject to constant changes. As with larger organisms, these changes are greatly influenced, if not absolutely caused, by the environment, while the organisms in their turn reciprocally produce or aid in the production of changes in the materials surrounding them. Many of them, such as the putrefactive germs, are incapable of existence within the living body and can only complete their life-history surrounded by that which is dead. Others again are capable of maintaining an existence in living tissues in a pathological state, being either the cause or the effect of such pathological condition as an accidental concomitant.

Since the discovery some years ago that tuberculosis owes its existence to a specific germ, the bacillus tuberculosis, many students have entered the field of bacteriological research, and extensive experiments have been conducted in order to discover, if possible, the microscopic organism or organisms that might be the *materies morbi* of the several contagious and infectious diseases. In the prosecution of these studies, diphtheria has received its full share of attention. At intervals during the past fifteen years or more, the discovery of the specific germ of the disease has been announced, but thus far in every instance further investigation has shown that the pathogenic germ of the disease, if there be such, has not yet been isolated. The Klebs-Löffler microörganism, discovered in 1883–1884, was for a long time thought to be the ultimate cause of the disease, but its claim as such has since been greatly weakened or destroyed, inasmuch as in a number of cases of diphtheria it was absent, and it has been found on the buccal and faucial surfaces in cases of measles, scarlet fever, and in cases in health. Professor Oertel, who early advocated the microbic origin of the disease (*Ziemssen*, 1868), now admits that that theory is only plausible, not proved. He expresses the belief that bacterial organisms cause the disease, though not directly, by producing ptomaïnes that infect the system and render the disease constitutional. The microbe itself is mostly confined to the surface, while the action of the virus is "widespread and deep." Professor Crookshank (*Lancet*, vol. i., 1888, p. 115) states as the result of his own investigations and those of Winckel, Fränkel, Eiselsberg, Löffler, Baumgarten, and others, that the microörganisms once thought to be the *materies morbi* of the various diseases—erysipelas, scarlatina, diphtheria, puerperal fever, surgical fever, pneumonia, typhoid fever, variola, vaccinia, measles, yellow fever, pyemia, septicemia, broncho-pneumonia, syphilis—are one and the same, namely, the streptococcus pyogenes, variously modified by the individual disease. Drs. Welch and Abbott, of Johns Hopkins University (*Bulletin of Johns Hopkins Hospital*, February and March, 1891), have recently published an article on the etiology of diphtheria, and from their own experiments and operations conclude that the Klebs-Löffler bacillus is absolutely the specific cause of the disease, that the blood and tissues are profoundly affected by the virus of that disease, and that microörganisms may gain entrance into the circulation and escape destruction."

We are thus at this time unable to state with any degree of certainty that this or that microörganism is the specific cause of diphtheria, or even that the disease is of microbic origin at all. Indeed, much evidence has been adduced that tends to prove that the virus of the disease is not a specific germ, and

[1] Read before the Wisconsin State Medical Society, June, 1891.

the opinion is held by at least a few good observers that cases may arise from a combination of unsanitary environments not fully determined. Repugnant as this view may be, in this era of germ-theory of infectious diseases, there are nevertheless many facts not to be ignored that appear to support it. For example, of fifty outbreaks of diphtheria in England (*British Medical Journal*, 1888, p. 167) it was only possible in four to trace the first case to contagion. In the remaining forty-six outbreaks, the first cases were all attributed to unsanitary surroundings; in 15 to cesspools, in 10 to defective drainage, in 11 to the keeping of animals in an unclean condition in close proximity to the house, and in the remaining 10 to decaying and offensive manure-accumulations. Cases of the disease, moreover, regularly appear in greater numbers in the winter months, a period relatively unfavorable to the growth of the lower forms of both animal and vegetable life. Thus, in the last five years, during the winter months there were in Milwaukee 245 deaths from diphtheria, whereas during the summer months of the same year there were but 92 deaths from this disease. Barnes (*British Medical Journal*, 1888, p. 167) gives prominence to the fact that the disease is as prevalent in rural districts as in cities and towns, the element of contagion in cities being counterbalanced by decaying animal and vegetable matter, and dampness of soil in the country. M. W. Taylor (*British Medical Journal*, 1889, p. 938) reports a number of cases of diphtheria that appeared to have been caused by mold-fungi on the walls of sleeping-rooms, and he advances the suggestion that these innocent vegetable fungi—aspergillus, coprinus penicillium—may by special cultivation become pathogenic, and referred to the experiments of Grawitz, Sepinger, Nägeli and Buchner to sustain his position. He thought that the existence of zymotic diseases depended, not on individual germ, but upon the soil in which the germ grew, and drew the inference that common molds, both by spores and byssoid mycelia, might originate diphtheria by growing on noxious media. The disease, once having arisen, spreads by contagion in public places and in private houses. In cities, particularly in the East, the sewers have become infected by the virus of the disease, so that many cases are attributed to defective plumbing, by which means dwellings are impregnated with sewer gas.

During the past year diphtheria has been unusually prevalent in the city of Milwaukee, the vast majority of the cases occurring in the outlying districts and in houses having no inside sewer connection, so that we have no reason to think that one sewage system has become the habitat of the *materies morbi* of the disease. Another fact observed in a large number of cases was that the cellars under the houses were low and damp, and frequently contained vegetable matter in a state of partial decomposition. In a number of instances, chickens or ducks were kept in the cellars, and the emanations from their excreta were added to those from decaying vegetable matter. While such environments may not actually cause the disease, it will certainly not be denied that they contribute to that end. Thus Dr. Sternberg (*Lomb. Prize Essay*, p. 38) says: "It seems extremely probable that the diphtheritic poison-germ is capable of generation, independently of the sick, in damp, foul places such as damp cellars, especially under old houses in which the floors come near the surface of the ground, leaving damp, ill-ventilated spaces."

While reluctantly compelled to admit that in spite of the enormous amount of labor expended in the search for it, we are still ignorant of the *materies morbi* of diphtheria, we are fortunately able to speak with greater positiveness as to the means to be adopted in order to limit its spread. Recognizing that all unsanitary environments are predisposing causes of the infectious diseases, reason dictates that such factors should, as far as possible, be removed. The soil should be drained so that the cellars may be free from dampness; decaying animal and vegetable matter should be removed; the thorough ventilation of enclosed spaces, of the cellars and rooms of dwelling-houses, should be secured; the source of water-supply should be investigated, a supply of impure water being a no less potent factor in the causation of disease than an impure atmosphere. Any locality in which attention is paid to these matters will generally exhibit a mortality below the average for the whole community; if these precautions are neglected the reverse will be the case. Thus, to compare four wards in the city of Milwaukee in which the contrast in this respect is striking. The mortality for the whole city for the year 1890 was 17.02 per 1000 of population; in the 15th and 16th wards, with a population of 16,389, in which the environments are comparatively sanitary and the drainage good, the mortality was 13.54 per 1000, whereas in the 8th and 14th wards, with a population of 28,576 and comparatively unsanitary surroundings and imperfect drainage, the mortality was 20.05 per 1000, that of the 14th ward alone being 21.72 per 1000.

The environment having been rendered as favorable as possible, the other measures to be enforced in limiting the spread of diphtheria may be summed up in the two words: *isolation* and *disinfection*. Under existing circumstances isolation cannot be perfectly accomplished in the large cities; an ideal isolation would require the removal of the patient to

an institution especially provided for his care, and the admission to his presence of none but the physician and nurse. So far as I am aware, there are not many cities in this country in which even an attempt has been made to secure such isolation, but in Great Britain and in Germany, where this has been more or less vigorously enforced, the results in lowering the mortality from diphtheria have been very striking (*Sanitarian*, September, 1890, p. 218). In cases of smallpox it is a comparatively easy matter to secure almost ideal isolation, for, with few exceptions, the people, even the most ignorant, are fully alive to the dangers of that disease and the mode of its propagation by contagion; but it is altogether different in the case of diphtheria, a disease which every year carries off its victims by thousands. It is not uncommon to find the room of a diphtheritic patient filled with sympathizing neighbors and their little children, and in order to secure private funerals in these cases it has been necessary for the health officials to use force in clearing the houses of people who were willing to submit their families to the probability of infection. Until this singular ignorance or indifference is removed it will be impossible to obtain more stringent legislation for the isolation of the infected, or even to rigidly enforce the laws already in existence. In 1887, the city of Boston provided a place for the treatment of contagious diseases; since that time public sentiment has been so educated as to render it possible to treat a constantly increasing proportion of such cases in that institution (the Boston City Hospital). An effort is now being made by the Health Commissioner to establish in Milwaukee a system of isolation-hospitals or cottages for the treatment of infectious diseases, and it is greatly to be desired that his efforts may be crowned by success. It seems to me that when public sentiment shall have been properly educated in this direction, and a large proportion of cases of disease, occurring especially among the poorer and more ignorent classes, is treated in hospitals provided for the purpose, to which visitors are not admitted, a great advance will have been made in preventive medicine. The city of London is not only the greatest, but is also the healthiest city in the world, having the smallest annual mortality, very largely because the system of isolation is thoroughly enforced.

Under the present system of placarding houses in which diphtheria or other contagious diseases exist, the number of cases occurring in an outbreak has been materially lessened, but placarding a house only secures partial isolation. If there are other children in the infected family, they are excluded from the schools, public or private, but they run at large upon the streets, enter neighbors' houses, and not infrequently are accompanied to their own homes by their little playmates. They go to the stores and markets, the father continues at his usual occupation, and the mother will even often leave the sick one to go out washing or scrubbing. The disease occasionally makes its appearance in a family the business of which is carried on at home, for example dressmaking or tailoring, and unless under police supervision the members will often continue their pursuits and infect families remote from and unknown to them.

The length of time during which isolation, as far as is practicable at present, should be maintained is an important question. It has been the custom of the Health Department of Milwaukee to remove placards from houses infected with diphtheria as soon as the attending physician reports the case recovered, and that is frequently within a week from the first notice of the disease. All experience goes to show that isolation for so short a time is entirely insufficient. At a meeting of the Society of Public Hygiene of Paris last year (*Sanitarian*, August, 1890, p. 154) it was decided that a child should not be readmitted to school in less than forty days from the date of the onset of the disease. Roux and Yersin (*British Medical Journal*, vol. ii., 1890, p. 753) remark: "Active diphtheritic virus can remain in the mouth for a long time after the malady is cured. Consequently diphtheritic patients should only be allowed to resume their ordinary course of life when they are no longer bearers of the bacillus." It is not uncommon for successive cases of diphtheria to occur in the same family at intervals of several days or weeks, or for the same child, after recovery, to be seized a second time. When families are so situated as to render it impossible to keep the sick in a separate apartment, it has been thought that the danger of the spread of the disease to other members of the household would be lessened if they used a gargle of a one per cent. solution of creolin four or five times a day (*Medical Record*, January 31, 1891, p. 136).

In case of death from diphtheria the body should be immediately wrapped in a sheet saturated with a 1 : 3000 solution of mercuric chloride and should still remain isolated. Funerals should be strictly private, no one being admitted to the presence of the body except those who have already been exposed, and the clergyman whose duty calls him to such places; the service over, the view of the body should be as brief as possible. Strictly private funerals should be rigidly enforced, there being no doubt whatever but that in cases of contagious disease, public or semi-public funerals materially aid in the spread of the disease. This was found to have been the case in Milwaukee during the past year, and our Commissioner of Health found it

necessary to enforce funeral regulations with a firm hand, a sanitary police officer attending every funeral to see that the law was observed. At first, some difficulty was experienced and in some cases physical force was necessary to disperse crowds that assembled about the remains of the dead. The people, however, have now learned that they can have funerals of only the most private kind, and the officers have no further trouble. Following the adoption of this rule by the Commissioner, the number of cases reported weekly has gradually diminished, so that there can be no doubt but that one source of contagion has been removed. While the rule as to private funerals has been thus rigidly enforced, the people have been assured that the law was not enacted for the purpose of restricting the rights of individuals, but for the conservation of the public health.

Disinfection is not less important than isolation in limiting the spread of diphtheria. The atmosphere of an enclosed space cannot be said to have been disinfected until not only the vitality of pathogenic microörganisms has been destroyed, but also the vitality of their spores. As practised by the Health Department, disinfection is not accomplished at all. Infected houses, to be sure, are fumigated, but that is about all it amounts to. We have abundant proof of this. When a member of a family falls a victim to the disease the children are frequently sent to a neighbor's or out of town. After the recovery or death of the patient and the fumigation of the house the children are brought back and in a large proportion of cases in their turn become subjects of the same disease. With the means at our disposal, however, this is all that is attempted for the public, and until that public is willing to place large resources in the hands of its health authorities and confer upon them greater power, it is *all that can be done in this direction.*

[NOTE.—At the present time the Health Department of Milwaukee has under consideration plans for the construction of a disinfecting patrol, by means of which it is hoped to secure more complete destruction of disease-germs, especially in clothing and bedding.]

In Milwaukee one man is expected to "disinfect" about a thousand houses per year, and as a matter of fact he does fumigate nearly fifteen hundred. The public will pay liberally to protect itself against fire and the predatory acts of the criminal class, but for the disposition of its feces and the prevention of disease it doles out the dollars with a niggard hand.

It is no part of my intention to enter at all minutely into the subject of disinfection. To do so would require a paper beyond the limits of this. It will suffice to call attention to the well-settled conclusions reached by experiments and confirmed by experience. The air in the sick-room should be kept as pure as possible; the use of disinfectants here seems to me entirely inefficient and illogical. No human being could long live in a room the atmosphere of which was impregnated with a disinfecting agent in degree sufficient to produce results; hence the futility of using anything of the kind. In fact, by obscuring foul odors emanating from the sick, positive harm may be done the patient and attendants. The only appropriate disinfectant for the room occupied by a diphtheritic patient is *pure air;* hence the room should be thoroughly and systematically ventilated, a change of air being effected as frequently as possible. By this means we effect disinfection by dilution and oxidation. The discharges of the patient should be disinfected, and especial care should be given to the discharges from the nose and throat, which should be received into cloths that immediately after having been used are to be consigned to the flames. As these discharges are the sources of contagion, great care must be taken that they are destroyed absolutely. The clothing and bedding used about the patient can best be disinfected by thorough boiling for half an hour or more. They may equally well be disinfected by immersion for four or five hours in a 1 : 2000 solution of mercuric chloride. The disinfection of the room which has been occupied by the patient must receive careful attention. The windows and doors should be tightly fastened, so that the room is as nearly as possible hermetically sealed, and, according to the directions of the American Public Health Association, three pounds of sulphur should be burned, in the presence of moisture, for every thousand cubic feet of air-space. The fumes of the sulphurous acid should pervade the atmosphere of the room for at least twelve hours (twenty-four would be better), and then the room should be ventilated. The carpets and the furniture should then be removed and thoroughly aired, while at the same time the wood-work in the room is vigorously scrubbed. Unless great care has been exercised in confining the contagion to the room occupied by the patient during the course of the disease, every room in the house should be treated in the same way. By this plan of disinfection I believe the *materies morbi* of the disease can be destroyed, so that susceptible persons may subsequently occupy the rooms with impunity.

Some years ago, while acting as health officer of a town in the northern part of Wisconsin, these means were thoroughly applied in three outbreaks of contagious diseases, namely, scarlatina, smallpox, and measles, with the result that only one house was infected in each outbreak, although the field was a good one for the spread of any one of these

diseases—that is, there had never before been a case of either of them in the town.

When the disease has prevailed to any extent among the pupils of a given school, that school should be thoroughly disinfected according to the directions already given, and I would suggest that, in cities, all of the school-houses should be submitted to this proceeding every year.

THE PURSE-STRING OPERATION FOR CYSTOCELE.

With a Report of Cases.

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EVERY practitioner of experience is well aware of the trouble and annoyance that a cystocele occasions, not only to the patient, but to himself; of the many expedients to which it may be necessary to resort to keep the prolapsed parts in their normal position, and the want of success that often attends his most persistent and painstaking efforts. As yet no means of mechanical support has been devised that, in a goodly number of the cases that come to us for treatment, permanently benefits or even temporarily remedies the displacement with comfort to the patient. Neither has operative treatment accomplished all that was fondly hoped of it.

To Dr. Marion Sims is due the credit of bringing to the notice of the profession an operation for the relief of cystocele, with which he claims to have had unusual success. In his *Notes on Uterine Surgery* he reports only one failure in the large number of cases operated on. Later operations, however, were not attended with as good results. In fact, owing to the stretching of the tissues, many of the cases operated upon were no better a short time after the operation than they had been before.

The writer believes that whenever a cystocele can be supported with comfort "by any kind of pessary with the only inconvenience of an occasional removal of it, and the substitution for a week or so of astringent tampons to allow an erosion to heal, an operation is not necessary, even though the pessary must be worn continuously; nor in the case of young women, whose vaginæ have not become overdistended throughout, and where a cure may be expected in a year or two, if the parts be properly supported; also in old women past the menopause, whose tissues have become so relaxed and flabby from age and childbearing, and whose vaginal walls have lost all contractility, so that a cicatrix would be sure to stretch soon after the patient left her bed." In cases like those referred to, an operation is not justifiable, because it is not necessary, or because there is no prospect of a cure; but in cases in which the woman objects to wearing a supporter, in which the tissues possess a fair degree of tone, in which the cystocele is too large to be cured by wearing a supporter, and in which there is rupture of the perineum that demands an operation, then anterior colporrhaphy is indicated and will usually be followed by a good result.

During the first years of my operative experience I performed the Sims operation, or some modification of it—but in all cases the sutures, which were of silver wire, were passed as Sims recommended, *i. e.*, transversely. The parts always healed, and for a time the operation appeared to be successful; but in a few months, in quite a large proportion of the cases, the parts began to stretch, and in a few months more the patient was in a condition similar to that existing before the operation. Another objection to this operation is the difficulty of removing the stitches, if the perineum is repaired at the same time, as it has been in all of my cases. Not satisfied with the results in these cases, about fifteen months ago I performed my first so-called purse-string or tobacco-pouch operation for cystocele, with very satisfactory results.

CASE I.—Mrs. B., thirty-eight years old; born in Germany; married nineteen years; was the mother of eight children, the eldest eighteen years old, the youngest two years old. Her labors were always comparatively easy and rapid. For the preceding ten years she had suffered from both rectocele and cystocele, the condition gradually growing worse. Doubtlessly, the perineum had been ruptured at the birth of the first child, although the patient did not know when the rupture occurred. Whenever she was on her feet for any length of time, a prolapse of the anterior vaginal wall, as large as a medium-sized orange, would take place, and every pessary that was tried failed to keep the parts in place. Hence, it was decided to operate. The operation was performed on March 6, 1890, at the patient's house, with the assistance of two members of the graduating class of Niagara University. For two or three days previously the woman had received the preparatory treatment usual in such cases. She was placed in the lithotomy position, and the legs supported by Kelley's Beinhalter. Before the patient is completely anesthetized there is always retching or straining, so that the parts are usually protruded to their full extent. Beginning at a point about half an inch below the meatus, and passing around the protrusion, near its junction with the parts that were in normal position, I cut through the mucous membrane and made a complete sweep of the cystocele, returning to the point at which the incision began. In this case the cut was less than an inch in front of the cervix. Then, with a tenaculum catching the membrane, with a knife I carefully dissected off the entire mucous membrane included within the line of incision, care being taken not to cut too deeply, as the bladder is easily entered, and it unnecessarily weakens the parts to remove more tissue than is

absolutely required. The membrane was removed in one piece, and the bleeding was slight. The denuded surface was two and three-quarters inches in its antero-posterior diameter, and about two and a half inches in the transverse. For sutures I used No. 7 braided silk that had been kept for six hours in melted wax one ounce, and carbolic acid and salicylic acid, of each half a drachm. Threading a piece, fifteen inches long, at each end with the needles that are used in operations upon the cervix, the first suture was passed nearest the cervix, on one side of the raw surface, in and out of the mucous membrane, about a third of an inch from the denuded edge, until the median line just below the meatus was reached. The same method was pursued on the other side with the other end of the suture. The wound was then cleansed, and with the point of a sound pressed in toward the bladder. The edges of the wound were brought closely together by crossing and pulling on the ends of the silk, in the same way as a purse or tobacco-pouch is closed. The suture was then tied. There was a little dimple in the center, but no raw surface was to be seen or felt. One end of the suture was cut short, and the other end brought out upon the thigh, and secured by adhesive plaster. A thick mass is formed on the anterior vaginal wall, the apposed raw surfaces of which adhere to one another without inconvenience, resulting in a firm support to the bladder.

The perineum was repaired by Emmet's operation. The patient was put to bed, and treated in the manner usual after such operations.

For the first twenty-four hours she had nothing but a swallow of hot water every hour or so. After that she was given beef-tea or broth, until on the third day her bowels were moved. This was insured by the administration of a grain of calomel every hour until three doses had been taken, followed by a Seidlitz powder two and a half hours later. The bowels were subsequently moved every second day. A light diet was given. The catheter was used but twice, the patient being allowed to urinate as soon as she was able to do so. After each urination the parts were cleansed with carbolized water from a fountain syringe. No vaginal douche was used. Ten days after the operation the suture was removed without difficulty, and union was found perfect. The sutures were removed from the perineum at the same time. The patient was kept in bed three weeks, when she was allowed to sit up, and a week later to walk about the house.

This patient is obliged to work hard, and to be on her feet a good deal. At this writing, nearly fifteen months after the operation, the support is apparently as good as it was when she got out of bed. She has no cystocele, and suffers no inconvenience whatever from the effects of the previous injury.

CASE II.—Mrs. H., forty years old, the mother of seven children, the oldest twenty-one years old, the youngest six years, was admitted into the Sisters of Charity Hospital, October 7, 1890. Her labors were said to have been severe, but not tedious. The patient was stout and fleshy, and only complained of the enormous cystocele and the accompanying symptoms. She stated that the trouble had existed for eight or ten years, and that it was growing worse.

The protrusion externally of the anterior vaginal wall was as large as a fetal head. The patient was unable to urinate without returning the prolapse with her fingers. The uterus also dragged down. The perineal rupture was slight. The patient was put in as good condition as possible, and four days later anterior colporrhaphy was performed as in the preceding case, the denudation, however, being much more extensive, involving an area three inches in the antero-posterior diameter, and nearly as large in the transverse. Excepting that the flap-splitting operation was performed on the perineum, the procedure and the after-treatment were the same as in the first case. The stitches were removed on the eleventh day, but the patient was not allowed to get out of bed for three and a half weeks. A week later she was permitted to walk. The union was complete.

The patient, who is a laundress, has followed her occupation for several months past, is well, and now, after the lapse of seven months, presents no indication of her former trouble.

CASE III.—Mrs. W., forty-two years of age, a widow, the mother of three children, the oldest twenty years old, the youngest nine, was admitted into the Sisters' Hospital November 1, 1890. Her labors had been severe and tedious. She had been a domestic for the preceding six years, but was then unable to work.

She had a decided cystocele, with a moderate perineal rupture. A week after admission I operated as in the cases related, doing the flap-splitting operation on the perineum. As the prolapse was not as great in this as in the previous cases, as much surface was not denuded, but the rest of the operation and the after-treatment were the same, except that the catheter was used but once. The stitches were removed on the eleventh day. The patient was allowed to sit up at the end of three weeks, and to walk about at the end of four.

There is now no prolapse or sagging of the parts.

I am aware that the last two cases are too recent to be considered definitely cured; yet, one of the patients has had nearly five months of hard work since the operation, and there are no indications of a return of her former trouble—and this was the worst case of the kind I ever saw. If the operation were not successful it would seem that there should be some indications of a recurrence of the previous condition.

In the last case, as already mentioned, there is now no prolapse or sagging of the parts, yet the woman complains of a dragging sensation in the pelvis, which I attribute to a dislike of work rather than to any pelvic trouble. It will, however, take

at least another six months to tell whether this operation will have been successful or not.

In the first case, the operation was performed sufficiently long ago, and the woman has done enough hard work since to fully demonstrate that in her case the benefit is permanent.

In addition to the foregoing cases, I have performed the operation in two others, with apparent success, yet time enough has not elapsed to determine definitely what the results will be. I am convinced, however, that better results will be obtained from this operation than from any other, as it gives a thicker and firmer support that is less likely to stretch.

One important point in this operation is to denude as large a surface as practicable—the cicatrix is the firmer, and the result is the more likely to be permanent. Another important element in securing a good result is to keep the patient in the recumbent position for some time, until union becomes secure and firm, so that stretching is not likely to occur.

ORIGINAL LECTURE.

THE HEART: ITS MURMURS, THEIR DIAGNOSIS AND TREATMENT, AND THE ACTION OF THE CARDIANTS AS A CLASS.[1]

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LECTURE V.

HAVING in previous lectures discussed the physiological actions of alcohol and of digitalis, we to-day begin with a consideration of convallaria.

In regard to *convallaria* there is comparatively little to be said. Of its two active principles only one, convallamarin, is supposed to have any action upon the heart. It, like digitalis, is a CHO compound and is transformed into and eliminated from the system as carbon dioxide and water. While passing through its cycle of change within the body it evolves heat and energy, as a result of which the force and length of the systole are increased. This salutary effect upon the heart appears to be largely due to the lowering of a previously existing unduly high tension; if any increased blood-pressure follows the use of convallamarin, it is a secondary result of the improved action of the heart. It is stated that convallaria should be clinically used when high tension contra-indicates the use of digitalis. It is also said that convallaria in some inexplicable manner stimulates the right heart in preference to the left, and especially in pneumonia. If convallaria primarily lowers arterial tension and secondarily improves the heart's action—which is in accord with clinical observation—its good effects upon the right heart in pneumonia are quite in harmony with general physiological laws and do not necessitate the supposition of an undemonstrable and specific action of the drug. By lowering the general blood-pressure, it very decidedly removes the resistance to the onflowing blood in front of the left heart, thus enabling the left ventricle more rapidly and effectually to pump the blood out of the engorged pulmonary vessels. This, in turn, makes more room within the pulmonary circuit, reducing the resistance in front of the right ventricle, and explains the apparent directly stimulating action upon the right heart, with its clinical results. As convallaria lowers the general blood-pressure, it tends to raise that of the splenic arcade and renal system. It is for this reason not diuretic, except in a mild and secondary manner, through a universal improvement in the general circulation and heart's action.

Strophanthus is another drug of exceedingly uncertain composition. As the evidence stands at present, strophanthus contains two CHO or glucosidal bodies. One of these is freely soluble both in alcohol and in water, the other is insoluble in both. Strophanthus is also said to contain two alkaloids, one of which is toxic and freely soluble both in alcohol and in water. The chemical atomicity of these alkaloids has not yet been formulated, so that their exact action is uncertain. This complex composition and positively poisonous nature of some of the contained active principles render the administration of strophanthus unsatisfactory. Again, the source and purity of the original plant render doubtful the absolute composition of any preparation used. Nevertheless, the most positive results are attributed to the action of strophanthus upon the system.

Personally I have had little experience with strophanthus and that little has been most unsatisfactory. My first acquaintance with strophanthus and its action upon the human economy was at the necropsy table. The subject in question had been admitted to the hospital a few days previously and the diagnosis of a mitral lesion was made. A mixture of strophanthus was administered. The cardiac murmur disappeared and the patient died. The post-mortem examination showed every organ in the body to be macroscopically sound. Microscopically no lesion of sufficient magnitude could be found to explain the sudden death. In every instance in which I have administered or recommended strophanthus, the patient has died, not necessarily from the action of the drug, but from the results of the legitimate pathological conditions. Cognizant of the great uncertainty as to the composition and actions of strophanthus, I have ceased to use it and am patiently waiting for further developments. Being in part a CHO compound, it must over-stimulate and ultimately injure or poison the cardiac muscle, like digitalis and other drugs of similar constitution. If it does not directly increase the blood-pressure, there ought to be no danger of the so-called cumulative or poisonous effects upon the muscle-fibers of the heart. If it does not increase the general tension, its diuretic action must be slight, limited and secondary to the uniform improvement in the circulation by the augmented heart power.

I have had no experience with *Adonis vernalis* or its active principle *adonidin*. If it be true that it is ten times as poisonous to the cardiac muscle as digitalis, I prefer not to experiment with it.

The same may be said of the active principle of

[1] A series of lectures delivered at the New York Post-Graduate Medical School and Hospital.

broom, *sparteine*, which is a toxic liquid alkaloid. It must of necessity be a dangerous drug. It may be a ready and positive cardiac stimulant, capable of being converted into urea, carbon dioxide and water (see table); but in passing through the changes necessary to its elimination as excrementitious matter it is likely to give rise to the development of toxic leucomaïnes or nitrogenous principles, with disastrous consequences.

This brings us to a consideration of the most valuable class of remedies in the treatment of cardiac affections, functional or organic, namely, the true cardiac tonics, or compounds that have a nitrogenous basis and are capable of forming body-tissue or of retarding retrograde metabolism.

POSSIBLE PRODUCTS OF OXIDATION OF THE CHO, CHN, AND CHNO DRUGS.

Drugs.	*Active principles.*	*Formula + amt. of O used.*	=	*Urea + Carbon dioxide.*	+ *Water.*
Alcohol,	Ethylic alcohol,	C_2H_6O			
Digitalis,	Digitoxin,	$C_{31}H_{52}O_7 + 51O$	=	$21CO_2 + 16H_2O.$	
	Digitalin, *glucoside*,	$C_8H_8O_2 + 12O$	=	$5CO_2 + 4H_2O.$	
	Digitalein, "	$C_{36}H_{60}O_{15} + 55O$	=	$25CO_2 + 20H_2O.$	
	Digitonin, "	$C_{31}H_{52}O_{17} + 71O$	=	$31CO_2 + 26H_2O.$	
	Digitin, "	Not formulated.			
Convallaria,	Convallamarin, "	$C_{28}H_{44}O_{11} + 57O$	=	$23CO_2 + 22H_2O.$	
	Convallarin, "	$C_{34}H_{56}O_{11} + 88O$	=	$34CO_2 + 31H_2O.$	
	Strophanthin, "	$C_{30}H_{50}O_{11} + 46O$	=	$20CO_2 + 17H_2O.$	
Strophanthus,	Strophanthidin, "	Not formulated.			
	Ineine, *alkaloid*,	Not formulated.			
	Strophantine, *toxic alkaloid*	Not formulated.			
Scoparius,	Scoparin, *neutral body*,	$C_{31}H_{22}O_{16} + 43^{1}/_{2}O$	=	$21CO_2 + 11H_2O.$	
	Sparteine, *liquid alkaloid*,	$C_{15}H_{26}N_2 + 46O$	=	$CH_4N_2O + 14CO_2 + 11H_2O.$	
Ammonium Carbonate,	Salt,	$2(N_2H_{11}C_2O_6)$	=	$3CH_4N_2O + CO_2 + 5H_2O.$	
Coffee,	Caffeine, *alkaloid*,	$C_8H_{10}N_4O_2H_2O + 13O$	=	$2CH_4N_2O + 6CO_2 + 2H_2O.$	
Nux vomica,	Strychnine, "	$C_{21}H_{22}N_2O_2 + 47O$	=	$CH_4N_2O + 20CO_2 + 9H_2O.$	
Opium,	Morphine, "	$2C_{17}H_{19}NO_3 + 8sO$	=	$CH_4N_2O + 33CO_2 + 18H_2O.$	
Belladonna,	Atropine, "	$2C_{17}H_{23}NO_3 + 85O$	=	$CH_4N_2O + 33CO_2 + 21H_2O.$	

First upon the list, as regards both rapidity of action and efficiency, stands *ammonium carbonate*. By a reference to our table of the possible results of the oxidation of various glucosides and alkaloids it will be seen that theoretically two molecules of ammonium carbonate, by a simple rearrangement of the atoms, without the addition of oxygen, yields three parts of urea, one of carbon dioxide and five of water. As there is no well-established evidence that ammonium carbonate is eliminated in the urine, perspiration or breath in a proportion approximating that in which it is administered, it seems rational to suppose that it passes through a series of changes within the system and makes its final exit from the body in the form of the excrementitious products enumerated. While undergoing this transition within the animal economy, it evolves energy that increases both the force and length of the systole. At the same time, it tends to regulate the cardiac rhythm and arterial tone, not producing decidedly high tension or abnormally rapid circulation. If, with this improved circulatory condition, together with the fact that the nutritive interchange is not arrested, a liberal allowance of proteids is digested and assimilated, and fats, sugars and starch abstained from, a permanent compensatory hypertrophy can rapidly be developed, fully neutralizing any functional and organic defect of a mechanical nature that may have been present.

Owing, however, to the irritating properties of ammonium and its salts, the remedy must not be pushed beyond a certain limit; neither should it be continued for too long a time. Ammonium is particularly adapted for immediate and temporary use, and when a powerful result is wanted at once. Like all nitrogenous compounds, if taken in too large quantities, it may be imperfectly transformed, with the production of poisonous compounds and disastrous consequences.

Five grains of ammonium carbonate, administered every two or three hours, will often place a weak and feebly acting heart in an excellent position to appropriate nutriment to its muscle-fibers more rapidly than any other drug at our command, unless it be alcohol. For quick and temporary action ammonia excels even alcohol in effectiveness, but for more continued action alcohol holds first place among the rapid and powerful stimulants. The most satisfactory results are often obtained by alternating the two.

The next best drug in the list of tonics is *coffee* or its alkaloid *caffeine*. This is also one of the CHNO compounds that is capable of being transformed within the system and eliminated as urea, carbon dioxide and water. While this change is taking place, the quantity of oxygen used is comparatively small. Clinical evidence strongly favors the theory that caffeine aids in the formation of the bodily tissues and gland-structures. If it does not absolutely produce new tissue, it has consummate power to intensify tissue, glandular and mental activity, and at the same time retard retrograde proteid-metabolism. It slowly, but steadily increases the force and frequency of the systole, moderately raises general arterial tension, but positively lowers the blood-pressure in the splenic arcade and renal arteries. It thus acts as a most perfect diuretic. As caffeine does not occasion intensely high arterial tension, but provides a steady and uniform vascular tone, it tends to improve the nutritive interchange between the blood in the arterial capillaries and the perivascular tissues. About three grains of caffeine, three or four times a day, are usually all that is required, and often smaller doses will answer every purpose.

What has been said of caffeine applies in most respects with equal force to *opium* and its alkaloid *morphine*. The latter, however, stimulates the heart the more powerfully, according to the quantity taken; it also has the peculiar property of raising the arterial tension when low and of depressing it when unusually high, in the same manner as alcohol. Were it not for the disturbing effects of opium upon the digestive functions and the action of the liver, no better cardiac stimulant and tonic could be found. So far as the heart and vascular tone are concerned, the action of opium is all that could be desired.

That morphine is oxidized and split up within the

system and escapes in some other form, possibly as urea, carbon dioxide and water, is supported by an abundance of clinical evidence. As, for instance, in those addicted to the habitual use of large doses of morphine, in whom there is no question as to the system being fully under the influences of opium and its alkaloid, careful examination of the urine fails to detect the presence of even the smallest quantity of morphine.

That morphine serves the purpose of a proteid food seems clearly established by the fact that confirmed opium-eaters, for years at a time, subsist almost exclusively upon the drug. In one instance of which I know, the patient lived to be over a hundred years old. This clinical phenomenon of individuals living almost exclusively upon opium was for a long time difficult of comprehension; but when it was recognized that theoretically morphine can be transformed into urea, carbon dioxide and water, that when taken in large quantities it cannot be found in the urine, or at least not in proportion to the amount ingested, nor in the other excretions, together with the clinical evidence that life may for years be almost exclusively (though but poorly) supported by opium, it was understood how morphine helps to build up the tissues and glandular structures, or helps to replace the worn-out protoplasmic elements of the body. If we do not admit this property, we are compelled to assume that in the absence of nutritive elements morphine has an enormous power to stay retrograde metamorphosis and sustain the vital forces in a most extraordinary manner. That morphine, even at its best, is a poor food-stuff must be admitted, and it should be employed only as a medicinal agent in cases of emergency; even then great care should be exercised in its use.

Strychnine and *atropine*, like caffeine and morphine, are of CHNO composition. They also are capable of being converted by oxidization into urea, carbon dioxide and water. While they are thus being converted within the system, they improve nutrition, and stimulate the force and nutritive vitality of the heart-muscle. They favorably modify the vascular tension and develop the highest type of nutritive interchange between the blood within the arterial capillary area and the adjacent perivascular tissues throughout the body.

A uniform cardiac rhythm and a normal vascular tone being absolutely essential for the most perfect nutritive interchange, a similar or slightly augmented action of the heart and a uniformly sustained circulation of a large volume of blood in the arterial capillaries is absolutely indispensable for the development and maintenance of a compensatory hypertrophy, to offset the mechanical defect or to remove the functional irregularity of the heart.

This last class of drugs, called tonics, is found to be the most serviceable for the accomplishment of this desirable result.

Ammonium carbonate for immediate action, followed by the judicious use of alcohol and a well-selected proteid diet, will quickly regulate the cardiac rhythm, steady the vascular tone and augment the nutritive function, not only of the heart-muscle, but of all the tissues and glands of the body.

For a more permanent action and for the development of a lasting compensatory hypertrophy of the muscular fibers of the heart-walls the following formula has been largely used at my clinic and in private practice, and has thus far yielded most satisfactory results:

℞.—Tr. belladonnæ	. . .	f℥ij–iij.
Tr. opii deod.	. . .	f℥ij–iv.
Tr. nucis vomicæ	. . .	f℥iv–vi.
Tr. gentian. co.	q. s. ad	f℥iij.

Sig.: f℥j every four hours.

With this combination and line of treatment, a permanently sustained and fully compensatory hypertrophy has been repeatedly established in the patients who have during the past five or six years come to my clinic for treatment. We have frequently pushed the digitalis and continued its use as long as the safety of the patient would admit, but in every instance the heart-muscle deteriorated under its continued administration. With the cardiac tonics, and especially this formula, the desired result could be obtained, even after the damaging effects of digitalis had been produced.

CLINICAL MEMORANDUM.

COMPLETE OUTWARD DISLOCATION OF THE RADIUS AND ULNA AT THE ELBOW.

BY C. R. PONTIUS, M.D.,
OF FREMONT, OHIO.

READING the report of the case published by Dr. Isham, of Cincinnati, in THE MEDICAL NEWS of July 11th, induces me to report my own case of complete lateral external luxation of the elbow-joint. This makes the twelfth, I believe, put on record in America.

The accident is certainly very rare, because Gross says: "The only instance of complete lateral dislocation of the elbow with which I am acquainted is one recorded by Nélaton."

August 18, 1889, F. S., a boy about fourteen years of age, while attempting to perform some feats on a horizontal bar suspended eight or ten feet from the ground, lost his balance, fell, and was picked up with a badly injured right elbow-joint. I examined the joint within one hour after the accident, and found the following conditions existing:

The olecranon of the ulna resting against the external surface of the external condyle of the humerus; the head of radius carried externally, but resting on the coronoid process of the ulna, the arm being slightly flexed, and pronated but little. The joint was necessarily considerably widened, with a corresponding diminution of the antero-posterior diameter. The ligaments of the joint seemed to be, and necessarily were, torn very badly. The joint was badly swollen, and the patient was suffering intensely. A bystander supported the humerus, and I grasped the bones of the forearm near the elbow-joint, using my hand as a fulcrum; holding the wrist with my other hand, I carried the ulna into its proper anatomical position, after which I returned the head of the radius to its normal position, and applied heavy sole-leather splints, properly padded, leaving the arm in a semi-flexed position, and ordered the almost constant application of cold water to the arm.

This was a severe injury, and I had but slight hope of

anything better than an ankylosed joint. In a few days the swelling lessened, and I instituted passive motion as early as I possibly could with safety, thus hoping to avoid the results that I feared. Convalescence was normal. He now has fair use of the arm, with a very good degree of flexion and extension, though neither function is perfect. Rotation is normal. He drives a dray, and has no difficulty in following his vocation.

NEW INSTRUMENTS.

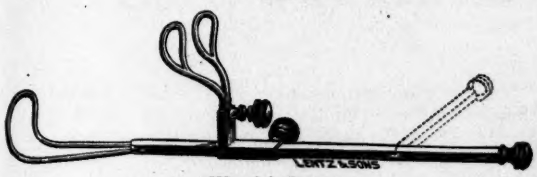
A SELF-RETAINING PALATE RETRACTOR.

BY T. H. WEAGLY, M.D.,
OF MARION, PA.

FOR the thorough examination of the post-nasal cavity, and for the various operations therein, such as the removal of adenoid tissue, galvano-cauterizations, and snaring of hypertrophied turbinates, the need of an effective, self-retaining palate retractor has long been recognized both by surgeon and specialist.

To meet this want the White Retractor, shown in Fig. 2, was brought out. It consists of a bar terminating in a wire loop of sufficient strength to hold the

FIG. 1.



Weagly's Retractor.

FIG. 2.

White's Retractor.

palate. On the bar slides an attachment intended to clamp the upper lip and thus be retained. My experience with the instrument thus formed has convinced me that for several reasons it fails to fulfil its purpose. In persons with a receding lip, or those wearing an artificial denture, it is almost impossible to secure it at all, and in many other cases, at the critical moment of making an application or operating, it is liable to drop from its position, causing great annoyance; and in cases in which it is retained, it often requires such firm adaptation that the undue traction upon the post-nasal parts gives rise to considerable irritation.

In order to secure absolute self-retention, adaptation to varying length of lips, and avoid undesirable traction upon the post-nasal parts, I have modified the lip-clamp as shown in Fig. 1, by lengthening the clamps and curving them backward. The fenestra are made narrow, and intended to hook within the tip of the nostrils instead of resting against the lip. A pocket with set-screw on the sliding nut permits the adjustment of the shaft of the clamp to the different forms and lengths of lip.

The instrument is, in reality, suspended from the tip of the floor of the nostrils; no undue traction upon the post-nasal parts is required, while absolute self-retention for all purposes is secured.

CURRENT LITERATURE.

THE ACCIDENTS AND SEQUELÆ OF THORACENTESIS.

POTAIN describes the accidents that may be observed after thoracentesis. They may be due (1) *To the pulmonary congestion* that follows the removal of the fluid, and is accompanied by an abundant, albuminous, bronchial expectoration. This bronchial hypersecretion is a result of the entrance of air into the bronchial tubes, which are unaccustomed to this abnormal irritation, and is not dependent upon distention of the lung. In the case of pleuro-bronchial fistula, when the air enters readily, the lung does not undergo distention; nevertheless, albuminous expectoration is at times observed after thoracentesis. (2) *To syncope.* When, for any reason, syncope is feared, special precautions should be taken to slowly remove only a small portion of the fluid. The patient should be operated on in the horizontal position. After the operation he should be kept in absolute repose. (3) *To embolism*, caused by clots from the pulmonary veins. The heart may be arrested, or the emboli may be carried into the large arteries of the brain, giving rise to hemiplegia; into the small cerebral arteries, occasioning abscess; or into other arteries, forming infarcts. Embolism of the pulmonary artery has been observed. When the action of the heart has been hampered by a large effusion, the pressure exerted upon the auricles, the torsion or the compression of the pulmonary veins, conjoined with a certain degree of irritation of the endocardium, may determine coagulation of blood within the heart. After thoracentesis, as soon as the blood-current is normally reëstablished, fragments of the clot may be detached and propelled into the pulmonary artery. Finally, patients, especially advanced in years, may succumb to *cardiac weakness.* When the circulation becomes easier the heart is unable to propel the increased volume of blood, and it ceases to act.

The accidents consecutive to thoracentesis are not rare, although their frequency is not great. An important factor is the quantity of fluid removed. The operation should not be too contracted. It suffices to withdraw one-half of the fluid, which should be allowed to escape slowly, simply by its own pressure. The forced expiration, consequent upon the cough induced by the escape of the liquid, increases the rapidity of the flow. It is the habit of some operators, when the liquid does not readily flow, to encourage the patient to cough. Such a procedure is not unattended with danger.

The frequent transformation of serous into purulent fluid must be related to the apparatus employed in the operation. This accident may be prevented by perfect asepsis. When the period for these accidents has passed, the ultimate prognosis will vary with the age of the effusion and the degree of compression to which the

lung has been subjected. In the case of recent and moderate effusions the pulmonary expansion is readily restored; this often happens in the course of the operation. Under other circumstances no change can be detected by percussion or auscultation in the course of the operation. It may be that the level of the fluid has not been altered, or the lung may not have expanded at once because of a condition of atelectasis. In such a case, while at first there may be no modification, on the next day it will be noticed that the dulness has disappeared. In other cases the lung expands rapidly, the pulmonary resonance and the vesicular murmur return, but on the following day the percussion dulness and the absence of the vesicular murmur reappear. The fluid has not been reproduced with prodigious rapidity. There is simply congestion of the lung, which has come about progressively and slowly, without the usual accompaniment of bronchial hypersecretion.

Should the bronchial hypersecretion be profuse and threatening, the sovereign remedy is morphine, subcutaneously. This arrests both cough and expectoration. For the intense congestion, dry cups and scarifications; very exceptionally, wet cups will be of service.

The changes that take place in the level of the fluid vary and are not always evident. The rapid expansion of the lung may displace the fluid that remains and cause it to appear at a higher level. On the other hand, in case of rapid decongestion of the lung, the level of the fluid may fall rapidly to the lowest portion of the pleural cavity. Sometimes the level of the effusion falls progressively. This is the most fortunate course. In other cases the level of the fluid remains nearly stationary for an indefinite period. Indeed, when the effusion has existed for a long time, the pleura becomes accustomed to the condition; therefore, an effusion should not be permitted to remain in the pleural sac longer than three weeks.

Finally, the fluid may reaccumulate. This is most apt to take place when efforts have been made to remove all of the fluid. In such cases dry cupping and scarifications, blistering and diuretics should be employed; but digitalis should not be administered. In subacute cases purgatives and diuretics (nitre and acetate of potash) should be given. A treatment worthy of consideration is that with sodium chloride. The patient should be placed on a dry diet, and the chloride of sodium administered every two hours in teaspoonful doses. By this means, a considerable increase in the quantity of urine is obtained, with a return of the appetite and the bodily forces, and a rapid absorption of the fluid.—*La Médecine Moderne*, No. 11, 1891.

TREATMENT OF EPILEPSY BY THE COMBINED EMPLOYMENT OF THE BROMIDES AND AN ORGANIC AGENT CAPABLE OF PRODUCING AN ANEMIC CONDITION OF THE NERVOUS CENTERS.

POULET calls attention to the many cases of epilepsy that are rebellious to the isolated action of the bromides. Notably in small children, the bromides administered alone are generally inefficacious. A large number of epileptic adults are no less refractory to the action of the bromides. In other cases these inorganic salts are poorly borne in the large doses in which it becomes necessary to administer them. Under these diverse circumstances good results may be obtained by associating certain organic agents with the bromides. It is to the cerebral ischemia produced by the bromides that their efficiency is due in the neuroses with congestion of the nervous centers, such as epilepsy and eclampsia. The organic agents that are useful in epilepsy act in the same manner upon the capillary circulation. Foremost among these is Calabar bean or its active principle, the sulphate of eserine. Then come picrotoxin and belladonna or the sulphate of atropine. Finally, digitalis meets certain particular indications.

According to the researches of M. Martin-Damourette, eserine determines two antagonistic effects: convulsions, by over-excitation of the motor centers, and paralysis, by a diminution of the excitability of the motor nerves. Large doses kill by over-excitation of the bulbo-spinal apparatus, with resulting convulsive asphyxia, before the function of the motor nerves becomes depressed in a degree sufficient to cause an antagonism to this over-activity of the centers. Small, fractional doses of eserine, on the contrary, suffice to paralyze the motor nerves without producing over-excitation of the nervous centers; once in this state of neuro-paralysis, the animal tolerates even toxic doses of eserine. If fractional or paralyzing doses of eserine are thus antidotal to massive, toxic, convulsive doses, they will also be antidotal to epileptic convulsions.

Atropine exercises upon the muscles effects similar to those of eserine. This is the reason for its efficacy in certain cases of epilepsy. It must be borne in mind that it is necessary to avoid giving belladonna or daturine to patients who are taking eserine. In truth, if eserine and atropine are given in doses non-toxic, but large enough to develop convulsive action, their spasmodic effects unite, and death follows from convulsive asphyxia. If these two agents are given in doses much less than the toxic dose of each, the hypokinetic effects are added to each other, and death follows by paralytic asphyxia. Finally, if the dose of atropine be too small, it will only develop neuro-paralysis sufficient to overcome the convulsibility that would be produced by fatal doses of eserine. One then realizes the antidotism of Fraser.

Side by side with Calabar bean and belladonna, in their anti-epileptic influence, may be placed picrotoxin. This latter, which is neither an alkaloid nor a glucoside, but a neutral principle, also exerts a different action according to the doses administered. In his *Traité de Toxicologie*, Orfila has well described the accidents occasioned by large doses. They are veritable epileptiform crises, with ocular congestion, lividity of the tongue, foaming at the mouth, general insensibility, and convulsions. According to Cayrade, picrotoxin in large doses determines insensibility and tetanic convulsions analogous to those of strychnine. The spasm, however, does not involve the extensors, but the body retains the attitude which it assumed at the onset of the toxic action—in other words, strychnine is tetanic in action and picrotoxin cataleptic. According to Pereira, picrotoxin in moderate doses has a depressing effect upon the voluntary muscles, occasioning obstinate difficulty of movement.

In small children, in whom the bromides alone are often but slightly efficacious in arresting epileptic con-

vulsions, one may associate with them indifferently, picrotoxin, atropine, or eserine. The combination acts surely, with brilliant results. Poulet has, with gratifying success, employed these organic agents in combination with the bromides in a large number of cases of epilepsy in both children and adults. He reports the case of a man, fifty years old, in which bromide of potassium in combination with picrotoxin and bromide of arsenic failed, while complete success followed the substitution of Calabar bean for picrotoxin. In a young woman twenty-one years old, the bromides alone and associated with picrotoxin failed to check the convulsions. Success followed, however, on associating with the bromide of potassium a preparation of Calabar bean or its active principle. In a woman fifty-three years old, after failure with the use of the bromides in various combinations, as well as with Calabar bean and with picrotoxin, the paroxysms were arrested by the administration of the sulphate of atropine associated with the bromide of potassium. A case of cardiac epilepsy was relieved by the combined action of bromide of potassium and digitalis. Poulet believes that the tendency to crime seen in certain epileptics as the fatal consequence of their malady, may be efficaciously combated by the medication suggested. It is necessary to determine which of the organic agents should, in a given case, be preferred. The state of the pupil will, at times, guide in the choice. If, as frequently happens, the pupils do not furnish any positive indication, the selection of the remedy must be governed by the effects produced.

The doses of the drugs will vary according to the age of the patient, individual idiosyncrasy, and the intensity of the disease. In adults, generally from 75 to 90 grains of bromide of potassium for a woman, and from 105 to 120 grains for a man, may be given daily. With this may be given ⅙ of a grain of sulphate of eserine, or ⅙ of a grain of picrotoxin, or $\frac{1}{60}$ of a grain of sulphate of atropine. Thirty drops of the tincture of Calabar bean or 12 grains of the crude drug in powder may be substituted for the eserine, and 30 drops of the tincture of belladonna or 7½ grains of the powdered root for the atropine. If the patient is a cardiac epileptic, and digitalis is preferred, 20 to 30 drops of the tincture, or 3 or 4 grains of the powdered digitalis may be given. The drugs should be given before or during meals.—*Bulletin Général de Thérapeutique*, No. 10, 1891.

POISONING FROM THE EXTERNAL USE OF TOBACCO.

TOBACCO has not been long employed therapeutically save as a domestic remedy. AUCHÉ (*Jour. de Méd. de Bordeaux*, No. 34, 1891) describes various forms in which tobacco has been topically applied, and the toxic symptoms that frequently follow such applications. Tobacco may be employed in the leaf, green or dry, in powder, in decoction, in maceration, in the forms of juice from the stems of pipes, or in vapor. All of these modes of employment have in some cases occasioned toxic phenomena. Two such cases of the employment of tobacco leaves have been cited by Gallavardin. In the first, in a woman, fifty years old, the external application of the leaves was followed by nausea, vomiting, hiccough, paroxysms of suffocation, excessive prostration, coldness of the extremities, cold, clammy sweats, and a soft, intermittent pulse. In the second case, in a man, thirty-seven years old, toxic symptoms appeared after the application of dried tobacco leaves mixed with honey. In some instances tobacco has been kept in contact with the surface of the body, not for therapeutic purposes, but in contraband pursuits. Thus, in the observation of Nameas (*Gazette des Hôpitaux*, 1864), a smuggler, who had covered his skin with tobacco leaves to escape the impost, presented extreme weakness of the pulse, cold sweats, depression, etc. Hildenbrand relates that the hussars of a troop who, with fraudulent intent, had enveloped themselves in tobacco leaves, though addicted to smoking, presented vertigo, pains in the head, vomiting, etc.

In other cases, poisoning is produced by the employment of tobacco in powder upon wounds, or following the application of an ointment composed of butter and tobacco, as in the cases reported by Kerkring. Wright has reported (*London Med. Gaz.; Annales de Hygiène pub. et de Méd. lég.*, 1874) the case of a man with hemorrhoids, in whom toxic symptoms appeared after sitting for only a few minutes upon a commode containing some tobacco and burning charcoal. More commonly, the poisoning is occasioned by the employment of the decoction, of the infusion, or of the juice of tobacco. Thus, in the case of Landerer, tobacco juice was applied to a chronic skin-eruption on the neck; in that of Westrumb, frictions of the juice of a pipe were applied to denuded portions of the skin; in that of Waterhall, the morbid symptoms manifested themselves after the application of the juice to a scurfy ulcer.

Mercier (*Bulletin de la Faculté*, 1819) has reported the case of a man with the mange, who, with a decoction of a half-ounce of tobacco, rubbed his limbs and trunk morning and evening, and who, on the second day, presented serious symptoms of poisoning. In the case of Murray, three children with scald-head were seized with vomiting, vertigo, sweating and convulsions after having had their heads bathed with a decoction of tobacco. In the case of Marrigues toxic symptoms appeared after the arms, hands, thighs and calves had been enveloped in linens saturated with a strong hot decoction of tobacco. Stanislaus Martin has related the case of a woodcutter and his wife, both with the mange, who energetically rubbed the entire body with a decoction of tobacco, and were soon seized with troublesome symptoms of tobacco-poisoning. M. Milier (*Bulletin de l'Académie de Médecine*, 1845) has reported that lotions of tobacco, employed formerly in the treatment of mange, at times gave rise to vertigo, pain in the head, colic, etc. M. Rougon (*Société de Médecine publique et de Hygiène professionelle*, 1883) observed analogous symptoms in certain colonies of America where the infusion of tobacco was freely used to destroy the chigoe. The presence of these parasites sometimes gave rise to more or less extensive ulcers of the feet. As an insecticide, infusions of a moderate quantity of tobacco leaves were employed. In some instances M. Rougon observed that the applications of this infusion were followed by diarrhea, vomiting, cold sweats, collapse, etc. Auché himself reports a case of tobacco-poisoning in a man, fifty years old, literally covered with pediculi pubis. Not wishing or daring to seek advice upon the method of freeing himself of

these parasites, he decided to use frictions over his entire body with a decoction of tobacco. Soon there appeared heaviness of the head, nausea, vertigo, dimness of vision, cold sweats, excessive pallor of the skin, trembling, great weakness, etc. From this series of observations, Auché draws the conclusion that the employment of tobacco as an external medicament is not free from danger; that tobacco applied to the skin, denuded or not, is capable of producing phenomena of intoxication similar to those produced by the drug taken in toxic doses internally.

THE EMPLOYMENT OF HYDROCHLORATE OF MORPHINE IN MENTAL AND NERVOUS DISEASES.

VOISIN (*Bulletin Général de Thérapeutique*, No. 14, 1891) claims that morphine is of great service in the treatment of certain neuro-mental affections. It is a sedative in the neuralgias, for pain, and for the centers of perception; by this last action it diminishes the sensibility of the brain to painful impressions. It acts efficaciously upon inertia, insomnia, sensory hyperesthesia, upon peripheral neuralgias, upon illusions and hallucinations, and consequently upon deirium. It is useful in mental affections with depression, or when there exists an anxious state, with moanings and lamentations. Many physicians treat slightingly the complaints of hypochondriacs, without considering that in every hypochondriasis there is an element of pain, an initial cause of complaint, and that the patients have, little by little, come to exaggerate the pains that they at first suffered. The ills of hypochondriasis are not only imaginary—there is an element of actual suffering.

In the treatment of the insane, morphine possesses the great advantage that it may be employed by subcutaneous injection. The adoption of the hypodermatic method of treatment of these patients is due to Erlenmeyer, Béhier and Bourdon, and its employment in mental disorders was first practised by Erlenmeyer, Roller and Krafft-Ebing. Voisin first used the drug in 1867; in the last twenty-four years his confidence in this method of treatment has daily increased. The subjective improvement is most encouraging; the patients state that their pains cease shortly after receiving the injections, that with the renewal of force they feel a renewal of will and energy; they are able to return to their occupations; this beneficial effect persists for several hours. Two injections in twenty-four hours are ordinarily necessary. Voisin always commences treatment with small doses (from gr. $\frac{1}{60}$ to $\frac{1}{30}$, increasing the dose gr. $\frac{1}{60}$ daily). The dose is slowly increased until physiological phenomena of favorable prognosis are observed. The patients who are cured, or the condition of whom is ameliorated by subcutaneous injections of morphine, present at first certain symptoms that subsequently moderate or entirely disappear. Among these are redness of the face and conjunctiva, nausea, vomiting, a sensation of heat, a feeling of humility, excessive fatigue, somnolence, emaciation and loss of weight, lowering of the arterial tension, as revealed by the finger and the sphygmograph; then a brightening of the countenance, with a return of intelligence, a clearing of the complexion, a liveliness of expression, an increase in weight, and in women a restoration of menstruation. The circulation presents evident modifications a little after the injection. The cheeks become quite red, and at times remain so for several hours. The conjunctivæ are strongly injected. The pulse changes notably, becoming full and accelerated.

The indications for the treatment of mental alienation with the hydrochlorate of morphine are especially marked in cases in which the return to health is simple and free from congestive complications. The remedy is useful in cases with hallucinations, in conditions of depression, in cases of anxious melancholia in all the forms of alcoholism, in melancholia either with moaning or with stupor, ecstasy, or suicidal tendency. In hysterical insanity decided success has attended this method of medication. Non-congestive puerperal insanity is also most happily treated in this way. In such cases, with hallucinations and maniacal delirium four to five days after delivery, Voisin has employed doses of a grain or more daily. The agitation and hallucinations have ceased at the end of six weeks, and sleep has gradually returned. In one case the patient was cured at the end of two and a half months, and has remained so since. In all the cases in which this method of treatment is adopted, a previous examination of the urine should be made to ascertain the absence or presence of any renal affection with which the hypodermatic medication of morphine would be incompatible.

The duration of the influence of the morphine upon the insane varies according to the degree and the variety of the mental disorder. In tranquil patients, such as certain melancholiacs, or some monomaniacs, the influence lasts nearly twenty-four hours; in maniacal patients with hallucinations and in agitated melancholiacs the duration of the influence, as a rule, does not exceed eight hours, and never reaches twenty hours. This is is also true of agitated hysterical patients. If it is desired to cure or ameliorate the condition, it is necessary to reinforce the morning injection with another in the afternoon, and sometimes with a third later in the day. The last two doses should be larger than the morning dose.

There are certain contra-indications to this method of treatment: (1) Insane patients in whom the lesions are inflammatory, either primarily or secondarily to lesions of the nervous centers, with epileptic insanity, or with any form of general paralysis, are made worse by opium medication; an error of diagnosis may be fatal to the patient. (2) Morphine is of no utility in insanity associated with arterial atheroma, and it may be harmful on account of the congestion to which it gives rise—as a result of which hemorrhages from vascular rupture may take place. The diagnosis of the anatomical nature of the insanity is of the greatest importance. The treatment of congestive or inflammatory insanity in this way is carefully to be guarded against.

Peculiar idiosyncrasies are sometimes encountered in the administration of morphine; some insane patients will receive considerable doses of the drug without manifesting any physiological effect, while others will not tolerate the smallest test dose.

Robert Koch has been made director of the Institute for Infectious Diseases and honorary professor in the medical faculty of the Friedrich-Wilhelm University of Berlin.

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PHILADELPHIA.

SATURDAY, SEPTEMBER 5, 1891.

THE SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

THERE seems to be a general unanimity of opinion that the London meeting of the Seventh International Congress of Hygiene has been an unqualified success. There was a pleasant mixture of so-called popular and of scientific topics, and certainly no one could complain of any severe limitation of choice. Only those possessing the gift of ubiquity could have managed to do anything like justice to the variety presented in the different sections of State Hygiene; Preventive Medicine; Infancy, Childhood, and School Life; Chemistry and Physics; Architecture in its Relation to Hygiene; Engineering in its relation to Hygiene; State Hygiene; and, finally, of Demography. The professors who had, so to speak, the title *rôle* to support, played their parts to perfection. One of them, with substantial as well as etymological accuracy, defined demography as "a method of drawing the public." But the more abstruse departments had also their lighter sides. The science of public health is, no doubt, only another name for an inquiry into the causes of disease, general and specific. But even epidemics, in virtue of their terrors, have a fascination for many minds, while a more wholesome interest will find abundant material in following speculations and suggestions that minister to a better physique; in other words, to the greater capacity of the masses for enjoyment. At first sight there is something gruesome in the catalogue of perils against which it is the object of sanitary science to protect the community. The PRINCE OF WALES, in his inaugural address, spoke the thoughts of many when he observed that "as one looked through the program it was impossible not to feel distress, and even horror, at the multitude of dangers in the midst of which we have to live." But he gave the needed consolation when he added that the great majority of these risks may, with due care, be averted.

The proceedings were naturally concerned much less with what has been already done than with what remains to be achieved. Knowledge in the abstract was not the goal of effort, but knowledge that could practically help mankind. There would be little use in compiling statistics about diphtheria, if the comparison of data thus obtained did not help us to discover the cause of the scourge. In such cases the study of causes is the first step toward that best form of cure—prevention. As yet, the most eminent experts must be content to go on patiently and indefatigably in the road of inquiry, sustained by the hope that, in the end, the mystery will yield to the genius of statistical research. It would have been welcome news had DR. SEATON announced that he and his fellow-laborers in this field had solved the problem; but he did the next best thing when he induced the Congress to pass a resolution calling on the European governments to set on foot a comprehensive inquiry. If the project of international conferences needed justification, it would be found in the necessity for world-wide coöperation in tracking to their origin the more subtle shapes of infectious maladies. India, that in so many other departments of human energy has served to enlighten the West, has been represented at the Congress, and we have no doubt that the attention paid to the Anglo-Indian observers will encourage many a young member of the medical department to make the most of the rare opportunities that his service in that cradle of epidemics gives him. The great Continental specialists who graced the Congress with their presence, and, in many instances, enriched the records of the proceedings with their remarks, may be trusted to do all that the laboratory and the hospitals will permit. But the battle with disease is essentially a soldier's battle. The discussion in the section of bacteriology as to the possibility of the transmission of tuberculosis to the human subject

by the medium of meat or milk as articles of diet, was not, it must be owned, appetizing. But, taking it altogether, it was reassuring, since it showed, on the one hand, that the risk is far slighter than the professional panic-monger would have us believe; and, on the other, it suggested certain practical precautions. It is in the investigation of such subjects as this that the necessity of tempering the results of physiological research and experiment with due regard for the facts and the conditions of every-day life becomes apparent. PROFESSOR BURDON-SANDERSON, for instance, while recognizing that there is a certain degree of danger in the supply of tuberculous meat, added that, if to-morrow a law were passed forbidding its sale, it could not be put into force, because of the difficulty of obtaining inspectors with sufficient skill and discernment. The reflection has a moral that may be carried far beyond the sphere of State medicine. As PROFESSOR BANG, of Copenhagen, recommended, the proper thing to do is to discourage the consumption of under-cooked meat. When doctors differ, a very simple sanitary code is very often the best concordat.

Topics, we need hardly say, vastly more intelligible than those to which we have referred, and no whit less important, engaged the attention of several of the sections. The chemists, it is gratifying to hear, hold that the smoke nuisance is amenable to treatment, and urge the authorities to address themselves practically to its abatement. It will, possibly, be a surprise to some, and a matter of regret to others, that the section of State Hygiene passed resolutions declaring that cremation is a rational and hygienic procedure that is especially called for where death occurs from contagious diseases, and urging the various governments to remove all legislative obstacles to the practice. To legalize is, of course, not necessarily to approve; but the considerations adduced by SIR HENRY THOMPSON undoubtedly went far to show that any other means of disposing of the dead, save burning, may frequently be the means of propagating disease. It may be hinted, however, that the decisions of the Congress of Hygienists, like those of the congress of trades unionists, do not always express the mature and impartial view of the whole memberhood.

On the vexed question whether under any circumstances and in any quantity, alcohol is bad for people of ordinary constitutions, there was by no means unanimity. Moderation approaching abstinence was, indeed, generally commended; but, while DR. ISAMBARD OWEN took up his parable boldly in favor of teetotalism as consistent with perfect health, others were found to plead that a little good wine or beer, or even spirits, taken regularly at meal-times, and always in modest quantities, tends to physical well-being as well as to comfort. Probably, in this conflict of authorities, the outer world will go on doing what it most likes. There is a sort of uncomplimentary concession to the weakness of the flesh in the theory put forward that, as most of us come of ancestors that drank, we should be well advised not to revert rashly to a more innocent regimen.

Everything in these days leads up to socialistic politics, and no one ought to be disappointed if, on such subjects as dinners to under-fed children at elementary schools, the application of scientific principles failed to secure unanimity of belief. There was more thoroughness than wisdom in the suggestion that poor parents should be sternly prohibited by statute from allowing their sons and daughters to sleep in the same room with themselves, and that, if poverty prevented them from providing ample and decent accommodation, the State should step in with the necessary allowance.

More cognate, perhaps, to the legitimate functions of the Congress were the striking reflections offered at an earlier sitting by MR. GALTON as to the law of population. There is certainly novelty in the suggestion that population does not necessarily and indefinitely tend to increase in civilized societies. The question lies at the root of nearly all political and socialistic speculations of the time, and it is to be hoped that when next the experts in demography assemble they will be in a position to elucidate what is still obscure in this important branch of statistical information.

SOCIETY PROCEEDINGS.

SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

Held at London, August 10 to 17, 1891.

THE Congress was opened by the PRINCE OF WALES, who delivered the Inaugural Address.

DR. BROUARDEL responded on behalf of the French delegates, DR. VON COLER on behalf of the Prussian, DR. CONRADI on behalf of the Italian, DR. ROTH on behalf of the German, and DR. KOROSI on behalf of the Austro-Hungarian.

In the Section of Preventive Medicine, SIR JOSEPH FAYRER delivered the President's Address. He devoted

himself to a consideration of the present aspects of preventive medicine, its recent development, how much it has operated and is now operating for the public good, how slowly but surely it is dispelling the cloud of ignorance and prejudice that has overshadowed and impeded the progress of sanitation, and how it is gradually imbuing the public mind with the conviction that prevention is better and often easier than cure, that health may be preserved, disease avoided, and life prolonged by the study and observance of certain well-known laws, which, correlating the individual with his surroundings, determine his well-being when conformed to, deteriorate or prevent it when neglected, and should enforce the maxim, *Venienti occurrite morbo.*

It is now pretty generally understood that about one-fourth of all the mortality in England is caused by preventable disease, that the death-rate of large communities may be reduced much below that at which it has been wont to stand, that the average duration of life may be made to approximate more nearly to the allotted four-score, and that the conditions of living may be greatly ameliorated. The chief obstacles to improvement have been ignorance and want of belief; a better knowledge of the laws of life and health, more rational comprehension of the nature and causes of disease, are gradually but surely entailing improvement in the conditions of living and in the value of life, and the diminution and mitigation, if not extinction, of morbid conditions which have in past times proved so injurious or destructive to life.

Great improvements have gradually been made in the mode of living. The houses are better constructed, the drainage and ventilation are more complete, the land is better cultivated, and the subsoil better drained; marsh fever and dysentery, at one period so rife, are unknown, and leprosy has long since disappeared. The death-rate is considerably reduced, and the expectancy of life enhanced. Water is purer, food is more varied and nutritious, clothing is better adapted to the climate, the noxious character of many occupations has been mitigated, and the mental, moral, and physical aspects of the people altogether improved; education is general, a better form of government prevails, and the social conditions are far in advance of what they have been; but still the state of our cities shows that improvement is demanded, and one object of this Congress is to point out why and how this may be effected, not only in this country, but throughout the world.

Preventable disease still kills yearly about 125,000, and considering the large number of cases for every death, it has been calculated that 78¼ millions of days of labor are lost annually, which means $38,750,000 per annum; this does not include the days lost by the exhaustion so often induced by the still too numerous unhealthy houses of the poor.

Towns, villages, and houses are still built in an insanitary way; the death-rate is still higher, and the expectancy of life lower than it should be, and though we have got rid of the terrible plagues of the Middle Ages, yet in this century, now closing, other epidemics have made their appearance: cholera has four times visited us; fevers, eruptive diseases, and diphtheria have prevailed; influenza has appeared several times, even recently, and after leaving us last year only to return with renewed virulence, caused in the United States a mortality almost equal to that of the plague.

That we can exterminate zymotic disease altogether is not to be expected, but there cannot be a doubt that we may diminish its incidence, and though we may never be able to reach the *fons et origo mali*, yet we can make the soil upon which the seed is sown so inhospitable as to render it sterile.

The scope and objects of preventive medicine are not limited to the removing of conditions which give rise to zymotic disease, nor even of those which compromise otherwise the physical welfare of mankind, but should extend as well to a consideration of the best means of controlling or obviating those which, attending the strain and struggle for existence, involve over-competition in various occupations, whether political, professional, or mercantile, by which wealth or fame is acquired or even a bare livelihood is obtained, and under the pressure of which so many succumb, if not from complete mental alienation, from breakdown and exhaustion of the nervous system, which give rise to many forms of neurotic disease, and add largely to the numbers of those laid aside and rendered unfitted to take their due share in the natural and inevitable struggle for existence.

The possible deleterious influence of mistaken notions of education, as evinced in the over-pressure which is exercised upon the young, the predominance of examinations, their increasing multiplication and severity, and the encouragement of the idea that they are the best test of knowledge, whilst true mental culture is in danger of being neglected, and physical training, if not ignored, left so much to individual inclination—this is another subject which demands the jealous scrutiny of preventive medicine, the duty of which it is to safeguard the human race from all avoidable causes of either physical or mental disease.

The records of the last fifty years prove the influence exerted by sanitary measures on vital statistics. From 1838 to 1854 the expectancy of life was for males 39.91, for females 41.85 years; from 1871 to 1880 it had increased to 41.35 and 44.66 years respectively.

The improved sanitation saves more children's lives, but the conditions of gaining a living are harder than they were, which accounts for the expectancy of life for adult men being less.

A further proof of the effects of sanitary work is a decreased death-rate.

An important result of the observations of the able medical officers of the Sanitary service of India has been to show that cholera is to be prevented or diminished by sanitary proceedings alone, and that all coercive measures of quarantine or forcible isolation are futile and hurtful.

In preventive, as in curative medicine, knowledge of causation is essential. It is obvious that any rational system of proceeding must have this for its basis. A certain empirical knowledge may be useful as a guide, but no real advance can be expected without the exactitude which results from careful scientific observation and induction. The spirit of experimental research, however, is now dominant, and progress is inevitable.

It is impossible to exaggerate the value of the scientific researches which have led to the antiseptic methods of preventing the morbific action of microörganic life, whether the toxic effects produced by them, or those

induced autogenetically in the individual. Theory has here been closely followed by its practical application in prevention and treatment of disease, whilst the study of bacteriology, which is of such remarkable preëminence at the present time, is opening out sources from which may flow results of incalculable importance in their bearing on life and health.

Important as are the researches into microbiology, there are other factors to reckon with before we can hope to gain a knowledge of the ultimate causation of disease. It is not by any one path, however closely or carefully it may be followed, that we shall arrive at a full comprehension of all that is concerned in its etiology and prevention, for there are many conditions, dynamical and material, around and within us, which have to be considered in their mutual relations and bearings before we can hope to do so; still we may feel satisfied that the causes of disease are now being more thoroughly sought out than they ever have been—all honor to those who are prosecuting the research so vigorously—and that though individual predilection may seem sometimes to dwell too exclusively on specific objects, yet the tendency is to investigate everything that bears upon the subject, and to emphasize all that is implied in the aphorism, *Salus populi suprema lex*.

A discussion was held on the "Mode of Preventing the Spread of Epidemic Disease from One Country to Another."

In the Section of Bacteriology, SIR JOSEPH LISTER delivered the Presidential Address. He paid a graceful tribute to the work of Pasteur and of Koch, and made brief reference to the work of Roux in diphtheria; of Metschnikoff in phagocytosis; of Behring and Kitasato in tetanus; of Hankin, and of Vaillard and Yersin.

DR. A. LAVERAN discussed the Etiology of Malaria. He described the chief forms of the hematozoön found in malaria as:

1. The spherical bodies. 2. The flagella. 3. The cruciform bodies. 4. The rosette-like bodies. The flagella could only be demonstrated in fresh blood; the other forms, however, were well seen in preserved blood. The blood in paludism was easily studied by rapid drying and fixation of the specimen by heat, followed by staining with a concentrated solution of methyl-blue or gentian-violet; a double staining could be effected by successively immersing the specimen of dried blood in concentrated aqueous solutions of eosin and of methyl-blue, whereby the red cells assumed a rosy hue, and the leucocytes, together with the parasitic bodies, were colored blue. Nuclei had been observed in both the spherical and the cruciform bodies. Two, and even three, different varieties of this hematozoön had been described (polymorphism). Similar hematozoa had been found in different animals—frogs, lizards, marsh-tortoises, birds. In many species of birds there was to be found a hematozoön so similar to that of paludism that most observers regarded the two forms as identical. The similarity was very marked, yet several points of difference existed; thus—in the blood of birds the cruciform bodies were not found; the parasitic elements were intra-corpuscular and never became free, as was often the case with the true paludic hematozoön; and the ameboid movements of the spherical bodies were much less notable in the case of the organism found in birds' blood. On the other hand, this latter hematozoön had been observed in birds living in non-marshy regions; it frequently caused no inconvenience to its host, and the inoculation of blood containing this hematozoön had given only negative results.

The subject of "Asiatic Cholera" was taken up.

PROFESSOR HUEPPE gave the result of his observations on the growth of Koch's cholera bacillus in artificial media. He had obtained positive results in his experiments on animals. He also described certain of the chemical changes produced by cholera bacilli in the media in which they grew.

DR. KLEIN did not accept the view that the bacillus described by Koch was the active agent in the production of cholera. He demonstrated the several species of comma bacilli isolated from typical acute cases of cholera by Dr. D. D. Cunningham.

PROFESSOR MAX GRUBER supported Koch's conclusions.

DR. BRUCE said that he had found the injection of a pure cultivation of Koch's bacillus killed guinea-pigs but not rats. He did not agree with Professor Hueppe in thinking that the comma bacilli formed spores. He found that comma bacilli grew well inside of eggs, and would live there longer than anywhere else.

PROFESSOR MILLER read a paper on "The Mouth as a Source of Infection." He enumerated the local and general diseases traced to the action of bacteria in the mouth, described the method of examining saliva for pathogenic bacteria, gave the results of inoculations with the saliva of healthy persons, and discussed prophylactic measures.

MR. HENRY SEWILL read a paper on "The Bacteriology of Dental Caries." He stated that the active agents in caries are acids and microörganisms.

PROFESSOR ALLEN MACFADYEAN presented a communication on "The Behavior of Bacteria in the Small Intestine of Man." He detailed the results of a study of the evacuations through an artificial anus at the termination of the ileum made for the relief of strangulated hernia.

PROFESSOR MAX GRUBER described and demonstrated a new pyogenic microörganism—micromyces Hoffmanni, belonging to the hyphomycetes, which morphologically closely resemble the actinomyces.

PROFESSOR CROOKSHANK read a paper on the "Streptococcus Pyogenes and the Identity of the Streptococcus Pyogenes and the Streptococcus Erysipelatosus."

MR. SAMUEL G. SHATTOCK and MR. CHARLES A. BALLANA read a paper on "Cancer as an Infective Disease." They stated that thus far the cultivation of a microbe of carcinoma had been unsuccessful. The transmission of carcinoma from one species to another had also failed. Numerous reasons were advanced for considering carcinoma as a parasitic disease. It was shown by statistics that carcinoma has become more prevalent.

DR. SHERIDAN DELÉPINE read a paper on "Psorospermosis as a Possible Cause of Epithelial Tumors." He endeavored to show that psorosperms produce tumors similar to papilliferous adenomata. Psorospermoid bodies were found in twenty-two of a large number of epithelial tumors. Definite proofs of the psorospermic nature of the lesions were, however, wanting. Psoro-

sperms from the liver of a rabbit can easily be cultivated in nutrient gelatin or in the clear serum obtained in some of the psorospermial cystic tumors. Dr. Delépine concluded that the bodies found were not true psorosperms.

PROFESSOR SIMON DUPLAY and DR. MAURICE CAZIN reported that they had been unable to find coccidia in carcinomata. They believed the so-called fuchsin bodies to be products of hyaline degeneration, not confined to carcinoma.

PROFESSOR D. J. HAMILTON read a paper on "Bacterial Necrosis of the Liver." The disease has been found in the cow, sheep, donkey, guinea-pig, and badger, and is characterized by rounded or irregularly-shaped deposits in the substance of the liver, deeply or superficially. The masses are hard, as a rule, yellow in color, and resemble neoplasms. Microscopically they are found to be liver-tissue in a state of necrosis, with the outlines of the liver lobules and cells perfectly preserved. The necrosis is evidently not due to interference with the blood-supply. Dense masses of microörganisms, usually bacilli, are found in the portal vein or invading the necrotic mass.

In the Section of the Relations of the Diseases of Animals to those of Man, SIR NIGEL KINGSCOTE delivered the Presidential Address.

DR. E. ROUX read a paper on the "Prevention of Hydrophobia," giving an account of the results obtained at the Pasteur Institute.

DR. GEORGE FLEMING presented a communication on the "Prevention of Rabies in Dogs." He insisted upon the destruction of rabid dogs, the control of ownerless dogs, the utility of muzzling, and the necessity for the taxation and registration of dogs.

DR. J. BARDACH reported the results of the Pasteur method of treatment as carried out during four years at the Bacteriological Institute at Odessa. The results were exceedingly satisfactory and compared favorably with those of other methods of treatment.

DR. HIME stated that those who had studied the Pasteur method were satisfied that it was established upon a scientific basis.

M. NOCARD, of Alfort, mentioned a prophylactic treatment which was applicable to domestic animals, at least to herbivora. M. Galtier had some time ago announced that the injection of rabic virus into the veins of the sheep or the goat did not produce hydrophobia, but rather conferred immunity. He himself had quite recently made a number of experiments, by which he had been able to show—(1) that the intravenous injection of rabic virus would not produce rabies in horses; (2) that if the quantity of virus injected was sufficient, these inoculated equines acquired an immunity against rabies; (3) that it was possible to protect equines inoculated by intra-ocular injection when there were introduced into the veins certain quantities of dilute rabid nervous material. From these experiments he thought it might be hoped that a prophylactic treatment might arise out of the labors of M. Galtier.

DR. C. R. DRYSDALE stated that, having frequently attended the inoculations at the Institut Pasteur, he could speak with the greatest admiration of the immense care and intelligence shown in carrying out the treatment. As to the issues of Pasteur's plan, he considered it now clearly proved that, when only 0.92 per cent. of deaths had occurred after this treatment, as compared with probably more than 20 per cent. in similar cases, it was an indulgence in an improper degree of scepticism any longer to deny the value of the treatment.

DR. OSTERTAG said it had been suggested that the muzzle was ineffectual because cats and wolves carried the disease as well as dogs, but that cases of this sort were rare was proved by the experience of Germany. Since the passage of the laws regulating the contagious diseases of animals, rabies had become a rare disease and only occurred along the French and Russian borders. These laws provided that all mad dogs, and those suspected of rabies, or even of having been bitten, were to be killed, and all dogs and cats within a radius of fifteen miles must be kept in confinement during three months each year. In Berlin all dogs wore muzzles, and a case of hydrophobia had not been reported for ten years. As a result of these laws a Pasteur Institute in Germany was unnecessary.

DR. ELIZABETH BLACKWELL called attention to the suffering of dogs made mad to produce virus; she herself had visited the Pasteur Institute and had seen a series of dogs in the various stages of induced madness.

PROFESSOR PERRONCITO indicated that in the municipality of Turin they had a laboratory for the Pasteur anti-rabic treatment that gave exceedingly good results, as published by the director, and he also mentioned that an experimental inquiry upon the same method of treatment had been commenced in connection with such animals as oxen, horses, etc., with most encouraging results.

(*To be continued.*)

SECOND CONGRESS OF TUBERCULOSIS.

Held in Paris from July 27 to August 2, 1891.

(Continued from p. 252.)

DR. BABES, of Bucharest, presented a communication on "Bacterial Associations in Tuberculosis." He stated that in children he had found that Koch's bacillus was often associated with other varieties of microörganisms. In every case of tuberculosis that he has examined he has found, together with Koch's bacillus, the staphylococcus and the streptococcus. In tuberculous arthritis the microbes of suppuration are always found; in tuberculous ulcerations of mucous membranes the streptococcus is also always present. As to the influence of these microörganisms on the development of Koch's bacillus, Babes is inclined to think that they favor the growth of this particular organism, as is exemplified in the guinea-pig, that suffers from suppuration and becomes more apt to contract tuberculosis; while, on other hand, it is not impossible that the secretions of Koch's bacillus produce a favorable soil or medium of culture for the other organisms. This fact of microbic association being known, therapeutic action ought to be directed to the destruction of the secondary microbes, which are more easily destroyed than Koch's bacillus.

DR. HALLOPEAU, on the other hand, presented a communication on the "Genesis of Tuberculous Suppurations," in which he denied the fact of the intervention of pyogenic microörganisms in all tuberculous suppurations. Cold abscesses, suppurative adenitis, and empyema may be exclusively due to Koch's microbe, the irritation

being inaugurated by the secretions of that particular organism. Hallopeau maintained that even the suppuration of lupus may be exclusively produced by the bacillus tuberculosis. The suppurative effects of the products of Koch's bacillus have even been demonstrated by injections of Koch's fluid, which give rise to suppuration, and it is known that this lymph has been previously sterilized.

DRS. VERNEUIL and BARETTA presented a communication on the "Influence of Microbic Association in the Evolution of Cold Abscesses," in which they endeavored to elucidate the cause of the transformation of a latent cold abscess into an acute one; as a result of their investigations they found that the presence of staphylococci and streptococci was necessary to transform a cold abscess into an acute one. In a cold abscess that manifests acute symptoms, *streptococci are always found*, while the presence of the staphylococcus is exceptional. As to the practical significance of this fact, it is known that if a cold abscess opens spontaneously, without having presented acute inflammatory signs, there remains a fistulous opening that heals with difficulty, the points of the abscess being infiltrated with tubercles; if, however, the abscess opens as the result of an intercurrent acute condition, or after running an acute course has been opened by the surgeon, the question arises, Have the pyogenic microbes any anti-microbic action as regards the bacillus of tuberculosis? MM. Verneuil and Baretta believe in the anti-bacillary action, for they have inoculated animals with inflammatory products obtained from an abscess that was opened after inflammation had taken place, and the result was negative as regards the development of tuberculosis.

M. ARLOING reported having conducted experiments to determine the relative influence of heat as applied to the virus of tuberculosis, and found that when tuberculous virus after being heated was inoculated into animals it occasioned suppuration, while, on the contrary, when the substance had not been heated, tuberculosis manifested itself.

DR. OLLIVIER presented a communication on "Tuberculosis Amongst the Working Classes." He stated that the most important cause of the propagation of tuberculosis is a failure to disinfect the rooms occupied by tuberculous patients.

When a patient amongst the working classes dies, the rooms occupied are given up, and in ninety-nine cases out of a hundred no antiseptic procedures are adopted in connection with the infected rooms. The consequence is, that those who subsequently occupy the same rooms, at the first cold which they may get, develop a chronic bronchitis, the specific character of which soon shows itself—a result of the drying of the tuberculous products expectorated by the former occupants of the room, which float in the air with the dust. As disinfection will never be properly carried out by the very persons concerned, it ought to be applied by sanitary boards in the respective districts, as is the case with cholera, variola, diphtheria, etc.

Several letters were read upon "The Influence of Influenza on Tuberculosis." DR. DUBROUDY, of Hyères, stated that certainly grippe cannot transform itself into tuberculosis if tuberculosis be not present in the system. In regard to the influence of one disease upon the other, several facts are to be considered: the nature and grave character of influenza; the nature and degree of tuberculosis; and, finally, the degree of resistance of the patient. Patients in the third stage of tuberculosis usually die as a result of the disease, while those in the second stage rapidly pass into the third stage and progress to a fatal termination.

PROF. CORNIL, of Paris, presented an interesting communication on "The Suppuration of Tuberculous Lesions." Suppuration is not simply the passage of white blood-corpuscles outside the bloodvessels; between pus and simple inflammatory edema there exists a wide gap, for the pus is made up of dead white blood-corpuscles, while in edema these same corpuscles or leucocytes are living. Pus is certainly the result of the action of certain microbes of great variety and also of certain toxines.

Moreover, pus is accompanied with a more or less extensive destruction of surrounding tissues which must be got rid of, while the leucocytes of simple inflammation play a useful part, since they aid in the reconstruction of the tissues. This explanation was given to show that the inflammatory edema that is consecutive to an injection of Koch's tuberculin, whatever may be the vascular congestion or migration of the corpuscles, does not alone lead to suppuration. In tuberculous lesions of the skin and lungs Dr. Cornil has made many injections of Koch's tuberculin, the doses varying from 0.001 gram to 0.150 and 0.200 gram, without occasioning the development of a single abscess.

Although in several instances M. Hallopeau has found Koch's bacillus alone present—an observation confirmed by Dr. Cornil—still the latter believed that in many cases of glandular and osseous tuberculosis other microbes are present, more especially the staphylococcus, and in rare cases the streptococcus. On the other hand, M. Arloing has observed that suppuration produced by Koch's bacillus was in direct proportion to the attenuation of the microbe—a relation that has been demonstrated in the case of other microörganisms. Two factors present themselves in this connection—the virus and the medium of culture.

Suppuration may be considered as an evidence of a feeble degree of reaction, due to an attenuation of the microbe, or to the nature of the culture-medium, the reaction produced by some one pathogenic microbe varying not only with the medium on which the organism has been cultivated, but also with the nature of the tissues of the individual. This is exemplified in experiments made by M. Pasteur, who has produced suppuration in guinea-pigs with hens' cholera—suppuration that healed spontaneously. Drs. Cornil and Chantemesse have produced localized abscesses in the guinea-pig and in rabbits with the microbe of the pneumo-enteritis of the hog; while the same pneumococcus that, without causing death, produces an abscess in a guinea-pig, will in from twenty-four to thirty-six hours kill a mouse by acute septicemia.

In regard to suppuration, Prof. Cornil stated that, together with Dr. Babes, he had some years ago produced an encysted abscess in a guinea-pig by means of the bacillus of bird-tuberculosis, to which this animal is refractory. Suppuration is also an evidence of the great resistance of certain tissues to the tubercle-bacillus, as is

exemplified in local tuberculosis, such as tuberculous orchitis, etc. In conclusion Dr. Cornil stated that in regard to suppuration in tuberculous lesions, not only must the degree of virulence of the microbe be considered, but also the nature of the culture-medium, which in this case is constituted by the tissues, or the organism itself.

MM. HALLOPEAU and JEANSELME read a paper on "Researches on the Nature of Erythematous Lupus." The point in question is whether or not lupus is tuberculous. As an illustration he took the case of a man that since youth had had a typical erythematous lupus and also some glandular tuberculosis, and finally died of acute miliary tuberculosis. Inoculations were made to prove the difference between the lesions, and while from the miliary granulations and caseous glands positive results were obtained, from the tissues from the lupus the results were absolutely negative; three guinea-pigs that had been inoculated were found absolutely normal one hundred and ninety days after the inoculation.

From clinical observations it is probable that erythematous lupus is a result of tuberculous infection, and if it is not inoculable in animals it is because the virus has been attenuated; hence the negative result of inoculations cannot be opposed to clinical facts. As Dr. Besnier has stated, the tuberculosis may be so modified in the organism of an animal that it will appear in a non-transmissible form in that culture-medium—the organism.

DR. CAPRET, of Paris, read a paper on "Medicated Air in the Treatment of Pulmonary Phthisis." For the preceding fifteen months he had treated with most favorable results all stages of phthisis with inhalations of compressed air impregnated with creasote. Patients are placed in a compressed-air chamber for four hours; the pressure of the atmosphere is gradually increased by means of a pump the air having been charged with creasote by passing through scraps of wood saturated with creasote, as a result of which the air contains on an average about 0.001 gram of creasote per liter. Within this chamber, in half an hour, one attains a pressure of one and a half atmospheres, which is maintained for three hours; it is then again gradually diminished for another half hour. During such a sitting of four hours the patient has absorbed about four grams of creasote; these séances are repeated daily. Dr. Capret has treated thirty patients, and in all the results obtained were most satisfactory; in six the bacilli disappeared from the sputa.

An interesting communication was presented by DR. L. H. PETIT, in the name of DR. SCHOULL, of Turin, in relation to "The Transmission of Tuberculosis by the Waste of Food Derived from Tuberculous Patients." Two cases were observed that became tuberculous by eating the remains of the food given to a young tuberculous woman. This led Schoull to institute the following experiment: He took three kittens that had been nursed by the same animal; two were fed with the remains of food obtained from tuberculous patients, and both died from a generalized visceral tuberculosis; the third one, that was used as a control-animal, was nourished with the remains of food obtained from non-tuberculous patients, and these presented no trace whatever of tubercular lesions. In a practical point of view, it is a most interesting fact to be known, as in poor families contagion in this way is quite possible.

DR. LESPINE presented a communication on "A Not Yet Well-known Complication of Lupus Vulgaris." The case upon which the report was based was observed in the service of Dr. Leloir. It was one of lupus vulgaris that was suddenly complicated by the appearance of general symptoms of a profound character—a typhoid state, with a rapid rise of the temperature, that in a few days rose to 40° C. (104° F.); at the same time, around the ulceration, phlyctenulæ developed that filled with pus, the ulceration extending as the suppuration increased. Local antiseptic treatment was sufficient to bring about a cessation of almost all the symptoms.

Dr. Leloir emphasized this complication, as it necessitates special therapeutic interference, for while non-ulcerative lupus contains no pyogenic microbes, the ulcerative variety contains many, among others the staphylococci; hence, in such cases, it is easily understood that antiseptic treatment will do more good than anti-tuberculous treatment.

(To be continued.)

CORRESPONDENCE.

LEIPZIG.

The Medical Department of the University—Professor Zweifel—The New Frauen-klinik—Sänger—The Polyklinik.

THIS is one of the most delightful cities, and it seems especially so after a sojourn in Berlin, with its hurrying crowds and almost constant noise. Here are found, comparatively at least, quiet and rest; here one moves in freer space, breathes a purer air, and beholds an ampler sky; there is less hurry, less apparent confusion and fewer confounding noises.

It is needless to say that great historical events belong to this city, and that it contains many localities associated with famous characters or incidents. Here one may see the room in which Napoleon awaited the, to him, disastrous result of the battle between the French troops and the allied armies—the year I will not attempt to give, lest I might go as far astray as the popular novelist, Rudyard Kipling,[1] does in regard to an ophthalmoscopic examination to which his hero is subjected by one of the leading specialists of London. The houses in which Gœthe and Schiller each lived for some years may be seen by the curious, and certainly they will visit the Auerbach cellar, made famous by "Faust," and see the curious paintings of scenes from that work, and examine the memorials of its great author, such as a few books, autographs, locks of hair, etc. An hour may be spent in the market house, one of the largest and most convenient, I think, to be found anywhere, albeit a person comparing the space given up to flowers to that devoted to meat might come to the conclusion that Leipzig people live more on sentiment than they do on animal food.

While my belief is that a physician ought to have a knowledge of something more than medicine, something

[1] The following passage is found in this author's story called The Light that Failed: "The blaze of a gas-microscope in his eyes made him wince."

besides familiarity with diseases and their symptoms, with drugs and their doses, advancing and strengthening his character by a larger culture, including literature, art, philosophy, and history, yet let me come to matters strictly professional. The medical department of Leipzig University has about nine hundred students, and of these probably between two hundred and three hundred will at the same time be engaged in the study of obstetrics and diseases of women; I was at one of Professor Zweifel's clinical lectures, and certainly there were not more than one hundred and thirty students; but the session is just about ending and it is to be supposed that many had gone home. The student, first one, then another, examines the patient, brought in from the ward upon a bed, and, after questioning him, Professor Zweifel corrects his errors if he has made any, and then makes some observations upon diagnosis, treatment, etc. He seems to me one of the best of teachers. In personal appearance he greatly resembles the late Dr. Albert H. Smith—not quite so large nor of so dark a complexion. His position as Professor of Obstetrics and Diseases of Women gives him the control of one hundred beds, and there is no other Professor in this department of the University; he has assistants—some of whom are well known by readers of German contributions to obstetric or gynecological literature, Döderlein for example—assistants only, not petty competitors and attempted rivals or superiors—such efforts by themselves or their friends would soon consign them to private life and personal contempt.

Dr. Zweifel kindly had one of his assistants take me to the new Frauen-klinik now nearly completed, though it will not be ready for occupation for a year. This building, which, independently of the ground, will cost more than three hundred thousand dollars,[1] is a model, so admirably devised and so well constructed. It will have a large lecture hall and operating theater, besides a small room with cement floor and walls of tiles for laparotomies; there is a room or hall for instructing midwives and provision for at least two hundred patients, I should think. Besides all this there is a large parlor, a waiting-room for patients and a consulting-room, and probably eight or ten additional rooms—cooking, dining, sleeping—all for the Professor of Obstetrics and Diseases of Women in the University of Leipzig, whose position carries with it the title and duties of the Director of the Frauen-klinik. He can have as many private patients to consult him at the hospital as choose to come. He will also have some private rooms for those who require operation, etc. When will anyone occupying a similar chair in any of the medical institutions of the United States have similar opportunities, rights, and immunities? But a far more important question—and it is unselfish, while the former might seem so—when will medical colleges, especially trustees of these institutions, recognize the importance of securing for medical students facilities for practical instruction in obstetrics and diseases of women corresponding with those that are found in the most important schools in Europe?

My chief object in coming to Leipzig was to see Dr. Sänger and some of his work; indeed, had it not been for his kind invitation I should not be here at all. Dr. Sänger, who has done more than anyone else to bring the Cæsarean operation into good repute, is a man thirty-eight years old, rather slight in form, very deliberate in action, and I should think more decidedly of a mathematical than of a poetical cast of mind; he formulates rules and obeys them. I have not seen him perform many operations, but the few that I have seen would be ample compensation for a much longer visit. His almost invariable use of silk, of course first made thoroughly aseptic, was quite a contrast with what I had witnessed in Berlin; his rare employment of wet sponges, but of dry antiseptic gauze for application to a bleeding surface, was also a notable difference. Finally, in a hysterectomy, the pedicle was treated extra-peritoneally, being ligated, not with wire but with rubber tubing; and for the ordinary transfixion needles he employed two ordinary sail needles, and the method seemed to me admirable in execution. I saw him perform his operation for ruptured perineum, but this has been described in at least one text-book well known to the American profession, so that I shall not attempt a description, and, at any rate, words without diagrams would be useless or confusing. The number of sutures, of fine silk, for uniting the sides of the vaginal flap astonished me, but the immediate result was perfect, part fitting to part with complete accuracy, and the new perineum promised complete success; Dr. Sänger stated that he had left the internal sutures five weeks without their causing any irritation. Another operation, not original with Sänger, however, nor did he so claim it (it probably was first derived from or suggested by one of Simon's operations), performed by him was stitching the cervix to the vaginal vault. The following is the method: a strong, curved needle, threaded with catgut, or silk, is held by the forceps; then the cervix is drawn so far down that a finger in the rectum can feel the retro-uterine cul-de-sac; next the needle is carried through the cervix on one side of the canal and into the peritoneal cavity, whence it is made to emerge in the vaginal vault; a similar ligature is passed on the other side; then each is tied. The operation is designed for retroflexion or retroversion, but its value is yet to be determined. Dr. Sänger did not speak hopefully of it.

The hysterectomy was a difficult operation, but admirably accomplished; it was performed on account of a myoma that had in part undergone cystic degeneration. The tumor not only occupied considerable space in the abdomen, but had also grown downward by the side of the vagina, which constituted the chief difficulty in the operation.

Dr. Sänger's operations are performed at his private hospital, a most admirably constructed and arranged building—indeed, considering too the ample and pleasant grounds attached to it, the best institution of the kind I have ever seen. I think it quite possible that the building alone cost sixty or seventy thousand dollars.

In addition to his hospital work and other private practice, Dr. Sänger has one or two hours a day at the "Polyklinik," where a number of patients attend, and where he gives instruction to his private students. Among the patients there one day I saw a girl of thirteen, pregnant by her father; the mother, who had left her husband, was pregnant by another man—a revelation of

[1] Leipzig has about one-third the population of Philadelphia, but when will the latter have such a building?

depravity which Dr. Sänger said was very rare, and he asked me not to think (as of couse I would not) such cases as characteristic of German morals.

Dr. Sänger is an earnest advocate of the *dry* treatment of wounds, *e. g.*, after the closure of an abdominal incision he applies iodoform very freely, not for any antiseptic properties, but simply to keep the parts dry; so, too, after a perineal operation, iodoform is applied and over it dry antiseptic gauze, and this dressing is subsequently repeated twice every twenty-four hours. He is a thorough believer in antiseptic surgery and has almost a wealth of means—sterilizing apparatuses, antiseptic solutions, etc., for carrying his faith into practice. He called my attention to the value of sand (sea sand is the best) for mechanical disinfection of the hands, using it with warm water and soft soap, the *sapo viridis* of the United States Pharmacopœia, I believe.

I ever gratefully acknowledge myself a debtor to Dr. Sänger for much useful knowledge.

Let me beg those who take the time to read these letters to pardon the frequent use of the first person singular; those who know the writer need no apology or explanation, but those who do not may be assured that it does not arise from any egotism, but simply from a desire to make the narrative free from all obscurity, and to secure for it some vivacity. It was said that only a good swimmer should attempt to read the writings of Heraclitus. It is my desire that whatever I write may be so plain that it can be readily understood by any reader.

T. P.

NEW YORK.

Public Baths—Dirty Streets—Leprosy Scares—Artificial Ice—Impure Water.

IN my last letter I referred to a proposition to establish public baths of the variety known as the "rain baths," or douche; already such a bath has been put in successful operation. The work was done under the auspices of the New York Association for Improving the Condition of the Poor, and the committee having the matter in charge has shown good judgment in selecting a site convenient to the multitudes that throng our down-town tenements. It is situated in Center Market Place, but a short distance from the indescribably filthy dens of Bayard Street, and "the Bend" in Mulberry Street. The building is divided into a number of bath rooms, so that the bather does not have to sacrifice privacy for cleanliness. In the women's portion of the edifice, provision is made for washing and drying clothes. Contrary to the opinion of the promoters of this scheme, the people of the neighborhood were not long in availing themselves of the privileges of the new bathing-place, as evidenced by the fact that 125 persons patronized it the first morning it was open. This is certainly very encouraging—so much so, that one is inclined to believe that after all the people of Gotham will see their foreign population looking clean and civilized long before they will have an opportunity of enjoying the comfort of clean streets. Our long-suffering people have grown so accustomed to having their Schneiderian membranes and conjunctivæ irritated and inflamed by dust, laden with all kinds of filth, to say nothing of multitudes of germs, that they have ceased to murmur; but now their burden is made heavier, and those who are compelled to remain in the city during the hot months are regaled with the stench arising from garbage barrels which are left unemptied on the sidewalks for several days at a time. If some impulsive citizen revolts at this state of affairs, and appeals to the police, he is told it is "out of their jurisdiction;" and if he complains to the street-cleaning department, he is met by an official, who shrugs his shoulders and sadly informs the indignant and anxious citizen that it is impossible to do more with the present appropriation, and that "Street Commissioner Beattie is a very much abused man." What effect the condition of our streets will have upon the public health remains to be seen, but at the present time it is a topic of deep interest to our sanitarians.

Nearly every summer, the dulness and apathy incident to this season induce some of the newspapers to start up a "cholera scare," or something of the kind. This time it is our old friend, the leprosy, which is honored with this prominence. Some of the press correspondents have nearly gone into hysterics over the alleged discovery of one or two cases of leprosy, and have proceeded at once to denounce what they are pleased to consider the insufficient steps taken by the Board of Health. They seem to forget all about what has been said in regard to it on similar occasions in the past, and are entirely oblivious of the fact that a leper has been in one of our large city hospitals for a number of years.

The contrast between this year and last, as regards that most necessary article, ice, is pleasant indeed—that is to say, to the consumers; but if I am not greatly mistaken, all but a favored few of the dealers are wroth with themselves, and with the world in general. It is certainly very silly and inconsiderate on the part of the consumers to desire cheaper ice, especially when they can at the same time obtain a purer article, but such is the fact, and so strong has the tide set in favor of artificial ice that it has become necessary for the losing parties to circulate broadcast all sorts of rumors concerning the unhealthfulness of the new product. And so it has come to pass that people, ordinarily well informed, may be heard saying that they are afraid to use the artificial ice, because "it contains ammonia," although they would not think for a moment of objecting to eating ice-cream on the ground that salt has been used in the freezing process. Again, many persons have received circulars containing an analysis made by Professor Leeds of a sample of ice alleged to have been made by *one* of these new companies, in which it is shown that the water from which the ice was made contained much noxious organic matter, and that the water from this ice contained quite a notable proportion of zinc. It is on account of the presence of this latter impurity that I refer to the circular. These companies all claim to make the ice from *distilled* water, and, as is well known, such water exerts a far greater solvent action on metal pipes through which it passes than does ordinary water; hence, if galvanized iron or lead pipes are used, zinc or lead is likely to be found in the water. The artificial ice factories have been so busy this season that it is not improbable that some of them have been hastily constructed, and the process of manufacture carelessly conducted, and that in consequence an otherwise highly commendable industry may be productive of much mischief.

Of kindred interest is the condition of our water

supply, and it must be said that the water is at present more than usually bad. Ever since the completion of the new aqueduct, about a year ago, it has frequently been so muddy as seriously to interfere with laundry work, and this has increased to such a degree that recently men have been employed to go from hydrant to hydrant and "blow off" the muddy water that had accumulated. Notwithstanding this muddiness, it is only within the past few weeks that the water has actually tasted badly. The condition of our water supply is at present the subject of an investigation by the chemists of the Board of Health, and so far as their work has been made public it shows that there are many sources of pollution of the Croton water. I do not wish to be understood as indorsing the sensational reports printed by an enterprising journal, which has set on foot an independent investigation of the Croton water-shed. In this connection, it is interesting to recall a paper read by Dr. C. G. Currier before the Section on Public Health of the Academy of Medicine, on the "Self-purification of Flowing Water." The author stated that, in general, water containing many and various bacteria is unsuitable for drinking purposes unless it has undergone the sterilizing influence of heat. Chemical tests to determine the purity of water are entirely inadequate; the modern science of bacteriology can alone be relied upon to settle this question, and it was on this account that the aid of bacteriology had been invoked in determining the amount of purification taking place in flowing water. Following out this line of investigation, it has been found by observations on the sewage flowing from Chicago, that the water showed evidence of purification after flowing eighty miles; and this was still more apparent at Peoria, one hundred and fifty miles distant. This purification is due to dilution, sedimentation, the antagonistic action of bacteria, and particularly to oxidation. Acids present in the water seem to exert no distinct disinfectant action, for in all kinds of bottled carbonated waters living bacteria may be found, unless these waters have been subjected to some sterilizing process. The Central Park reservoir, in this city, shows a certain amount of purification resulting from sedimentation, but much undesirable contamination of the water here might be avoided by moistening the dusty and much-frequented walks and roads in the immediate vicinity of this reservoir. Observations in the old Croton aqueduct showed that the average flow was two and a half miles per hour, and that providing no further contaminations occurred, the water became distinctly purer after flowing a few miles. Some have claimed that a water supply can be readily purified by pumping air freely into the water, but the value of such a measure would seem to be very questionable when it is remembered that numerous bacteria have been found in ice formed from the spray of waterfalls. Here the combined action of agitation, aëration, and freezing, have failed to destroy the bacteria. While Dr. Currier claims that the most practical and the safest way of sterilizing water, in order to render it potable, is to boil it for an hour, Dr. Chandler seems to have been staggered by the hardihood of bacteria which persisted in living in the icy spray, for he was quoted as saying that he did not think it made much difference whether or not one drinks polluted water, and he backs up this rather audacious statement by pointing to certain statistics which show that Albany, which receives the water polluted with the sewage of Troy, reports six cases of typhoid fever, while Troy, during the same period, had five cases of this disease. Such conflicting opinions, I fear, will tend to swell the numbers of those who object to drinking water in any form.

NEWS ITEMS.

The Mississippi Valley Medical Association will hold its seventeenth annual session at St. Louis, October 14th 15th and 16th. A program of interesting papers has been prepared, and provision has been made for a thorough discussion, in which representative men from various sections of the country have been invited to participate. Dr. I. N. Love is the chairman of the Committee of Arrangements.

Proceedings of the Tenth International Medical Congress.—It is announced that the publication of the *Proceedings* of the Tenth International Medical Congress, held at Berlin last year, has so far progressed that the reports of section five for internal medicine will be issued in a short time. This will conclude the second volume (including the sections of anatomy, physiology, general pathology, pathological anatomy, pharmacology, internal medicine and pediatrics). Volume V. (containing the papers of the sections of dentistry, hygiene, railway hygiene, climatology, medical jurisprudence and military sanitation) will be ready for distribution on the completion of sections fourteen and sixteen. The reports of sections to complete Volumes III. and IV. have gone to press.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM AUGUST 18 TO AUGUST 31, 1891.

WYETH, M. C., *Captain and Assistant Surgeon.*—Sick-leave of absence extended three months, on surgeon's certificate of disability.

KIMBALL, JAMES P., *Major and Surgeon.*—Is granted leave of absence for twenty-five days.

POTHEMUS, ADRIAN S., *Captain and Assistant Surgeon.*—Is hereby granted leave of absence for one month, to commence on or about September 3, 1891.

PILCHER, JAMES E., *Captain and Assistant Surgeon.*—Is relieved from duty at Fort Clark, Texas, on expiration of leave of absence, and is assigned to duty at Fort Ringgold, Texas.

HAVARD, VALERY, *Major and Surgeon.*—Granted three months' leave of absence, to take effect on or about September 5, 1891.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF THE MEDICAL CORPS OF THE U. S. NAVY FOR THE TWO WEEKS ENDING AUGUST 29, 1891.

DU BOSE, W. R., *Passed Assistant Surgeon.*—Ordered to duty at Naval Academy, Annapolis.

HARMON, G. E. H., *Surgeon.*—Detached from Naval Academy, Annapolis, and wait orders.

WELLS, HOWARD, *Surgeon*—Ordered for temporary duty at Naval Station, New London.

A. A. HOEHLING, *Medical Inspector;* J. B. PARKER, *Surgeon;* and O. D. NORTON, *Passed Assistant Surgeon*, ordered to Naval Academy, Annapolis, September 3d, to examine physically candidates for admission to the Naval Academy.

HESLER, F. A., *Passed Assistant Surgeon.*—Detached from U. S. S. "Pensacola," and ordered to the U. S. S. "Charleston."

CORRECTION.—For the name of Dr. Longaker, in the twelfth line from the bottom of the first column of page 238 of THE NEWS of August 29th, read Dr. Langrehr.